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Site-Wide Soil and Waste Management Plan
Boeing Realty Corporation
Former C-6 Facility
Torrance, California

Prepared for:

Boeing Realty Corporation
3760 Kilroy Airport Way
Suite 500
Long Beach, California 90806

Prepared by:

Ogden Environmental and Energy Services Co., Inc.
5510 Morehouse Drive
San Diego, CA
(858) 458-9044

OGDEN

ENGLAND GEOSYSTEM

October 31, 2000
Project No. 322781000/0001/3171

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15 November 2000
C6-BRC-T-00-003

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

BOEING

Attention: John Geroch

Subject: **SOIL AND WASTE MANAGEMENT PLAN FOR BOEING REALTY CORPORATION, FORMER C-6 FACILITY, 19503 SOUTH NORMANDIE AVENUE, LOS ANGELES, CA**

Dear Mr. Geroch:

Please find enclosed for your review, a copy of the subject document prepared by Ogden Environmental and Energy Services Company, Inc. for Boeing Realty Corporation.

If you have any questions concerning this document, please contact the undersigned at 562-593-8623.

Sincerely,

Stephanie Sibbett
Boeing Realty Corporation

Cc: Mario Stavale, Boeing Realty Corporation
Scott Lattimore, Long Beach Division

enclosure

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October 2000
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OGDEN ENVIRONMENTAL AND ENERGY SERVICES

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November 9, 2000

Mr. Brian Mossman
Boeing Realty Corporation
3760 Kilroy Airport Way
Suite 500
Long Beach, California 90806

Subject: **Soil and Waste Management Plan**
Former C-6 Facility - Torrance, California

Dear Mr. Mossman:

Ogden Environmental and Energy Services Co., Inc. (Ogden) is submitting the enclosed Soil and Waste Management Plan (SWMP) for the above-referenced site. Ogden has prepared the SWMP to assist in the planning and management of soil and waste generated during site demolition and redevelopment.

If you have any questions or want to discuss the contents of this SWMP, please feel free to contact me at (858) 458-9044.

Sincerely,
Ogden Environmental and Energy Services Co., Inc.

Scott P. Zachary
Project Manager

Richard M. Farson, P.E.
Senior Engineer

SPZ/RMF/pag

Enclosure:

cc: File #799999620

REGISTERED PROFESSIONAL ENGINEER
RICHARD M. FARSON
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ALCOA	Aluminum Company of America
AOC	area of concern
bgs	below ground surface
BRC	Boeing Realty Company
CCR	California Code of Regulations
Cr(VI)	hexavalent chromium
CSC	Columbia Steel Company
DAC	Douglas Aircraft Company
DOT	Department of Transportation
DPC	Defense Plant Corporation
EIA	environmental investigation area
ESA	environmental site assessment
HASP	Health and Safety Plan
IDW	investigation-derived waste
lb/ft^3	pounds per cubic foot
LTTO	low temperature thermal oxidation
mmHg	millimeters of mercury
Ogden	Ogden Environmental and Energy Services Co., Inc.
OVA	organic vapor analyzer
PCB	polychlorinated biphenyl
POL	petroleum-based products, oils, and lubricants
PPE	personal protective equipment
ppm	parts per million
PVC	polyvinyl chloride
RAWP	Risk Assessment Work Plan
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SCAQMD	South Coast Air Quality Management District
SWMP	Soil and Waste Management Plan
UN	United Nations
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
VGAC	vapor-phase granular activated carbon
VOC	volatile organic compound

SECTION 1
INTRODUCTION

Boeing Realty Company (BRC) is demolishing and redeveloping the former C-6 aircraft manufacturing facility in Torrance, California. BRC has retained Ogden Environmental and Energy Services Co., Inc. (Ogden) to prepare this plan to assist ongoing soil investigation and demolition activities. The pre- and postdemolition soil investigations will generate potentially impacted soil cuttings and other so-called investigation-derived wastes (IDWs). Localized areas of soil impacts that could impede or prevent redevelopment may subsequently be removed or remediated after the surface structures and paving have been removed. These postdemolition soil remediation activities could also result in the removal of larger quantities of impacted soil. This Soil and Waste Management Plan (SWMP) presents procedures for handling, profiling, and disposing of or recycling excavated soil and soil cuttings, and other IDW generated during investigation and remediation of the former C-6 Facility (Facility).

It is anticipated that contractors other than Ogden may also use this SWMP to manage wastes such as groundwater generated during monitoring well development water or aquifer pumping tests; therefore, wastes associated with these activities are also discussed in this document.

1.1 Background Information

The Facility is located at 19503 South Normandie Avenue in Torrance, California (Figure 1). The Facility is divided into four parcels: A, B, C and D (Figure 2). This SWMP has been prepared for Parcel C. Parcel C consists of Buildings 1, 2, 3, 19, 20, 32, and 66, which are partiality or completely demolished. Parcels A, B, and D have already been investigated and are currently being developed.

The Facility was farmland prior to the 1940s. Defense Plant Corporation (DPC) first developed the Facility in 1941 as part of an aluminum reduction plant. The Aluminum Company of America (ALCOA) operated the plant until late 1944. From 1944 until 1948, the site was used for warehousing by the War Assets Administration. In 1948, the Columbia Steel Company (CSC) acquired the property. In 1952, the U.S. Navy purchased the property from CSC and established Douglas Aircraft Company (DAC) as the contractor and operator of the Facility for the manufacture of aircraft and aircraft

parts. DAC purchased the Facility from the Navy in 1970 and continued manufacturing aircraft components until 1992. BRC acquired the Facility in 1996 when it purchased McDonnell Douglas Corporation.

Most manufacturing operations at the Facility have been inactive for approximately 8 years. The manufacturing equipment has been removed from the Facility, although a limited amount of assembly and activities related to warehousing continued through mid-2000. Currently, the Facility is closed and the buildings are either partially or completely demolished.

A wide variety of chemicals and blended products have been used at the Facility over the last 60 years. These include aviation fuels; other petroleum-based products, oils, and lubricants (POLs); chlorinated and aromatic volatile organic compounds (VOCs); adhesives; sealants; mineral acids; caustic solutions; and other inorganic chemicals associated with metal plating and various types of pesticides. Some of these compounds have been accidentally released over the years and have impacted vadose zone soils and, in some locations, the underlying groundwater. Examples of other impact sources are underground storage tanks (USTs), fuel distribution lines, sumps, and other "wet" process areas. BRC is currently investigating and, where necessary, remediating these releases as they are identified.

Subsurface investigations have shown that the Facility is underlain by a heterogeneous mix of primarily clays, silts, and fine-grained silty sands. Groundwater is typically encountered at about 60 to 70 feet below ground surface (bgs).

After removing the existing surface structures and pavement, BRC plans to install new surface and subsurface infrastructure (streets, sewers, storm drains, and utilities) as needed to sell, redevelop, or lease the lots. The overall goal is to create a new, community-oriented, mixed use commercial/retail complex.

1.2 Site Investigation

In 1996, BRC retained Kennedy/Jenks Consultants of Long Beach, California, to conduct a Phase I Environmental Site Assessment (ESA) for Parcel C. The Kennedy/Jenks Phase I ESA identified numerous features within the Facility as potential sources of soil impacts.

Investigative techniques include direct-push and hollow-stem auger drilling methods to collect soil samples for chemical analysis.

Concurrent with the Phase II soil investigation, other BRC contractors will conduct a groundwater quality investigation and remediate areas of known groundwater impacts. The groundwater investigation and remediation programs are expected to include drilling and installation of monitoring and extraction wells. Activities related to the soil and groundwater investigation/remediation programs are expected to include:

- asphalt or concrete coring
- subsurface utility clearance
- direct-push or hollow-stem auger drilling/soil sampling
- groundwater monitoring and extraction well installation, development, and sampling
- limited soil removal
- equipment decontamination
- aquifer pumping tests
- handling of used personal protective equipment (PPE) and management of other IDW

Soil cuttings, wastewater, and other IDW derived from the above-listed activities could contain any of the many chemicals used by BRC and its predecessors at the Facility.

The soil investigation is being performed in accordance with the following documents prepared by BRC contractors:

- Site-wide Health and Safety Plan (HASP)
- Environmental Investigation Area (EIA)-specific Sampling and Analysis Plans (SAPs)
- Site-wide Risk Assessment Work Plan (RAWP)

These documents are cited, as appropriate, throughout this SWMP and should be referred to for specific information regarding the Phase II soil investigation.

1.3 ANTICIPATED REMEDIATION ACTIONS

It is likely that the Phase II soil investigation will identify localized near-surface, vadose zone soil impacts. Therefore, BRC's redevelopment plans include provisions for removal or remediation of near-surface soil impacts that may impede or preclude redevelopment. In this context, BRC has differentiated between near-surface soil impacts and deeper soil and/or groundwater impacts.

For the purpose of the Facility redevelopment program, "near-surface" is considered to be the upper 12 feet of the soil profile, as this is the maximum anticipated depth for subsurface utility and foundation excavations. It is anticipated that soil impacts within the upper 12 feet can be removed or remediated in the short term prior to redevelopment. BRC anticipates that longer-term environmental issues will be accommodated in the redevelopment plans such that wells, subsurface piping, and other remedial facilities can be installed when the facility is redeveloped. Thus, longer-term remediation efforts may continue unobtrusively during and after redevelopment. Based on this distinction, the Phase II soil investigation will focus primarily on the upper 12 feet of the soil profile.

Potentially hazardous constituents likely to be encountered in the subsurface include aviation fuel; POLs; aromatic and chlorinated VOCs; and metals, including hexavalent chromium (Cr[VI]). Quantities of impacted soil will vary according to site-specific conditions. Potentially hazardous constituents and impacted soil volumes will be assessed during the Phase II soil investigation.

1.4 REGULATORY AGENCY REQUIREMENTS

Handling, storage, transportation, and disposal of impacted soil and other IDW are subject to federal, state, and local regulations. The principal governing factor is whether the waste is hazardous or nonhazardous. A description of the waste characterization process is provided in the U.S. Environmental Protection Agency (USEPA) document entitled *Hazardous Waste Identification*, a copy of which is included as Appendix A of this SWMP. Briefly, the four characteristics, any one of which may characterize a waste as hazardous, are:

- **Ignitability.** Ignitable wastes are wastes that can readily catch fire and sustain combustion.

- **Corrosivity.** Corrosive wastes are acidic or alkaline (basic) wastes that can readily burn flesh, or corrode or dissolve metal or other materials.

- **Reactivity.** Reactive wastes readily explode or undergo violent reactions when exposed to air, water, or occasionally under normal handling conditions.

- **Toxicity.** Toxic wastes may be considered environmentally toxic, persistent, or bioaccumulative, or may potentially leach "dangerous" concentrations of certain toxic chemicals into groundwater if disposed of in a solid waste landfill.

In general terms, it is somewhat unusual to encounter impacted subsurface soil that is corrosive or reactive because native soils tend to neutralize or buffer these characteristics. Soils containing aviation or other fuels could conceivably be ignitable. However, this is, again, atypical, since a solid may be considered ignitable if it "is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture, or spontaneous chemical changes, and, when ignited, burns so vigorously and persistently that it creates a hazard." Depending on the type(s) and concentration(s) of potentially hazardous constituents present, certain soils could be considered toxic. Determination of toxicity can only be made on a case-specific basis; accordingly, no attempt is made herein to project types or quantities of potentially toxic wastes that may be generated during the subject Phase II soil investigation activities.

In addition to the four criteria listed above, USEPA considers certain types of waste material hazardous based on the processes that generated them. Examples include certain wood preserving and petroleum refinery wastes. These wastes are commonly known as "listed wastes."

Hazardous wastes may only be temporarily stored at a facility for 90 days, unless the wastes are being accumulated pursuant to California Code of Regulations (CCR) Title 22 Section 66262.34, or the facility has a storage variance or is permitted to store wastes for longer periods, as indicated in its Resource Conservation and Recovery Act (RCRA) Part B Permit. In many cases, it may take weeks to obtain and evaluate the laboratory test results necessary to characterize a waste as hazardous. In such instances, the 90-day storage period does not begin until the hazardous waste classification is established.

Regardless of whether a waste is hazardous or nonhazardous, records must be maintained regarding its transportation and ultimate disposition. For hazardous wastes, a Hazardous Waste Manifest must be completed. The manifest describes the waste and/or includes the listed waste control number and identifies its hazardous constituents. Copies of the Hazardous Waste Manifests are kept by the generator (in this case BRC), the transportation company, the disposal facility, and (in California) the state. Thus, hazardous wastes can be tracked from "the cradle to the grave." For nonhazardous wastes, a Bill of Lading or a Nonhazardous Waste Manifest may be used. Copies of these documents are typically kept by the generator, the transportation company, and the disposal/recycling facility. However, there is no obligation to forward a copy to the state.

One local regulation that may affect how waste materials generated at the Facility are handled is the South Coast Air Quality Management District's (SCAQMD's) Rule 1166, which limits emissions of VOCs. According to the SCAQMD, VOC-impacted soil is a soil that registers 50 parts per million (ppm) or greater of VOCs when measured by an organic vapor analyzer (OVA) at a distance of up to 3 inches from the soil surface. Rule 1166 requires the following:

1. The owner or operator must notify the SCAQMD Executive Officer by phone at least 24 hours prior to an excavation likely to involve VOC-containing soil, monitor the excavated material for VOCs, and cease excavation and cover the impacted soil if impacts are detected. The notification shall include the name of the owner or operator, location of the facility, location of the excavation, and the start/expected completion dates of the excavation.

2. A person treating or handling VOC-impacted soil must notify the Executive Officer by telephone within 24 hours of detection of VOC-impacted soil and implement soil mitigation measures approved by the Executive Officer using Best Available Control Technology.

3. A person shall not engage in or allow any spreading of VOC-impacted soil that results in uncontrolled evaporation of VOCs to the atmosphere.

Exemptions to provisions 1 and 2 include emergency soil decontamination or excavation performed pursuant to the requirements of an authorized agency officer. Exemptions to

provisions 2 and 3 include treatment of less than 1 cubic yard of impacted soil, decontamination of soil containing organic compounds with initial boiling points of 302°F or greater, removal of soil for sampling purposes, accidental spillage of 5 gallons or less of VOCs, decontamination of soil impacted by natural sources, and decontamination of soil containing organic compounds with a Reid vapor pressure less than 80 millimeters of mercury (mmHg) or an absolute vapor pressure less than 36 mmHg.

1.5 Existing BRC Policies and Procedures

BRC has two policies pertaining to hazardous wastes and the handling of potentially impacted soils. Technical Information Series Volume 34, entitled "Complying with Hazardous Waste Regulations," addresses hazardous wastes, and Environmental Procedure DAC-062-043 pertains to the characterization and handling of potentially impacted soil. Copies of these policies are included as Appendix B of this SWMP. This SWMP is intended to be consistent with BRC's written policies.

SECTION 2
MANAGEMENT PROCEDURES

This section outlines procedures for segregating, containerizing, labeling, and handling soil and/or other IDW within the Facility and for profiling and manifesting these materials prior to offsite transportation and disposal/recycling. A flowchart showing the overall process for handling wastes generated during the site investigation is presented in Figure 3. Typical waste quantities of soil IDW generated during soil investigation activities are summarized in Table 1. A matrix of waste quantities, containers, and approximate disposal/treatment costs is presented in Table 2.

2.1 CONTAINERS AND LABELS

Potentially impacted soil and/or other IDW must be placed in appropriate containers. Appropriate containers include, but are not necessarily limited to, the following:

- 55-gallon (7.3 cubic feet) United Nations/Department of Transportation (UN/DOT)-approved, 17H-type steel drums with lids
- 8-cubic yard roll-off bins with open or sliding tops
- 20-cubic-yard roll-off bins with open or sliding tops
- 12-cubic yard low-sided roll-off bins with open tops
- 4,000- or 6,000-gallon polyethylene "poly tanks" with closed tops
- 500-barrel (21,000-gallon) steel "Baker tanks" or "Frac tanks"

These containers will be provided by BRC through one or more of its contractors. Environmental consultants/contractors involved in the Phase II soil investigation and remediation are not allowed to bring waste containers onsite.

Requests for containers should be made in advance by contacting BRC's hazardous waste contractor.

A Waste Container Request form should be used to request containers. A blank Waste Container Request form is included in Appendix C of this SWMP.

Estimates of the numbers of containers will be based on the numbers, depths, and diameters of the borings to be drilled, subject to the segregation requirements outlined in

Section 2.3. Larger containers and large quantities of drums require a minimum of 24 hours notice and can be delivered directly to the point of use.

Requests for waste container labels should be made concurrently with the requests for containers. These labels will be sequentially numbered and preprinted, to the extent possible, based on information provided by the requestor. Examples of preprinted information may include the type of waste (soil, water, PPE, etc.), the generating process (drilling, equipment decontamination, etc.), the approximate location of waste generation (building and column numbers), special handling requirements, and the type of chemical analysis required, if any. Unless specific information is available in advance, the preprinted labels will typically contain the heading "PENDING ANALYSIS," indicating that the waste material has not yet been classified as hazardous or nonhazardous. An example of a partially completed "Pending Analysis" label is included in Appendix C of this SWMP.

2.2 Concrete and Asphalt Cores

Most, if not all, of the buildings at the Facility feature concrete floor slabs, and most of the exterior areas are paved with concrete or asphalt. These floor slabs and paving materials will typically be cored or saw-cut to facilitate access to the underlying soil for subsurface investigation purposes. The resulting cores and pieces of saw-cut pavement are considered nonhazardous construction debris unless there are indications otherwise. Examples of such indications could include obvious stains, saturation by solvents or petroleum-based fuels, or stains from polychlorinated biphenyl (PCB)-containing oil.

Cores and pieces of saw-cut pavement to be managed as construction debris will be transported by the consultant/contractor and placed in a low-sided roll-off bin. These bins may be moved closer to the work area to minimize traffic and travel costs. Cores and pavement sections from any area of the Facility may be consolidated in this container. There are no labeling requirements for the environmental consultant; however, a record will be kept of which cores (or group of cores) were placed in each container.

BRC or BRC's contractors will be responsible for preparing the necessary paperwork for construction debris to be transported off the site for disposal or recycling. Currently used BRC-approved disposal/recycling facilities for nonhazardous construction debris are listed in Table 3.

2.3 DRILL CUTTINGS AND OTHER SOIL IDW

Most of the subsurface investigation techniques to be used in the site investigation will result in soil being brought to the ground surface. Common examples are borings drilled using hollow-stem auger techniques. Even direct push-type borings will generate soil, if only by way of discarded samples. Other processes that may generate relatively small quantities of soil are removal actions that occur once the Facility demolition phase is complete.

Soil generated by any of the processes listed above will be placed in 55-gallon drums or roll-off bins, depending on the volume generated (Table 1). Roll-off bins must not be filled to the top or they will be too heavy to pick up and transport. Specific weight limitations are as follows:

Roll-off Bin Capacity	Weight Limitation	Depth of Fill in Container*
8 cubic yards	18,000 pounds	1.75 feet
20 cubic yards	18,000 pounds	3.5 feet

* Note that the depth of fill is a calculated value based on a bulk density of 120 pounds per cubic foot (lb/ft^3) and an assumed bulking factor of 1.5.

Soil from more than one source may be consolidated within a single container (drum or roll-off bin), provided that all of the sources are within the same EIA and the anticipated chemical impacts are similar. Broad contaminant groups for the purposes of waste soil segregation are:

- Metals Cr(VI)
- VOCs
- POLs
- PCBs

For waste profiling purposes (Section 2.6), records will be kept on the contents of every waste container. These records will include the sequential label number, container type, the boring/well/sample station number, EIA, area of concern (AOC) number, and building number. A Waste Container Contents Log form will be used to maintain these records. A blank Waste Container Contents Log form is included in Appendix C of this SWMP.

When containers are full or partially full, the sequentially numbered labels will be securely attached by the contractor filling the container. If the outside of the drum is soiled, it will be cleaned prior to attaching the label. For added security, clear adhesive tape should be placed over the label and the label number written on the white drum lid. A second copy of the label should be placed in a plastic bag, sealed, affixed to the underside of the drum lid, and sealed inside the drum. When the drum is filled, the lid will be attached and secured using the bolt ring device. For roll-off bins, the lid should be slid into place to cover the soil at the end of each workday.

Container pickup will be requested from BRC (same contact as for container request) as necessary and appropriate. BRC's contractor(s) will typically relocate the containers to a central staging area pending profiling and offsite transportation for disposal or recycling.

2.4 Equipment Decontamination Water

To minimize the likelihood of cross-contamination, equipment used in the Phase II soil investigation and in related postdemolition activities will be decontaminated frequently. Decontamination procedures may include steam cleaning or detergent wash/rinse cycles. The quantities of decontamination water generated will typically be contained in 55-gallon drums.

As with the drill cuttings (Section 2.3), equipment decontamination water may be consolidated by EIA but should be segregated based on the following broad contaminant groups:

- Metals, including Cr(VI)
- VOCs and POLs
- PCBs

The contents of each container will be documented in terms of the sequential container number, the boring/well/sample number, EIA, AOC, and building number (see Waste Container Contents Log form in Appendix C). Labels will be filled out and attached in a similar manner as for the drill cuttings, and container pickup procedures are also the same. BRC typically considers equipment decontamination water to be hazardous waste, regardless of how or where it is generated, and disposes of it accordingly.

2.5 USED PERSONAL PROTECTIVE EQUIPMENT

PPE will be worn by Ogden's employees and subcontractors to protect against exposure to potentially hazardous chemicals during the Phase II soil investigation and related postdemolition activities. Used PPE will be discarded at the end of each day and will generally include Tyvek® coveralls, disposable inner gloves, disposable boot covers, and/or used respirator cartridges.

BRC typically considers used PPE to be nonhazardous but, nevertheless, requires it to be placed in 55-gallon drums. PPE may be consolidated without restriction (i.e., PPE from different EIAs may be consolidated in a single container). Container labeling, content records, and pickup procedures are the same as for drill cuttings.

2.6 WASTE PROFILING

Waste profiling is the process by which BRC determines whether a waste is hazardous or nonhazardous and where it can be disposed of or recycled. Waste profiling will be BRC's responsibility, not the responsibility of the consultant or contractor that generated the waste.

To the extent possible, BRC prefers to profile wastes based on analytical results for soil or water samples collected during the waste generation, thus avoiding the need to open waste container(s) to sample and analyze the waste. For example, if a 55-gallon drum contained drill cuttings from 12 hand-augered borings in a certain EIA, the waste would be profiled based on analytical results for soil samples collected from those borings. This process enables average chemical concentrations to be used to profile the waste and can be more representative than collecting a grab sample of the waste itself. The ability to use this method of waste profiling, however, is dependent on knowing the contents of each container; hence, the importance of the Waste Container Contents Log form (Appendix C).

Nonetheless, containerized waste may require direct sampling for profiling or other purposes. This requirement may arise if a container is filled with waste for which there are no associated sample analyses or if data provided to BRC are inadequate for profiling. BRC's environmental department will direct Ogden or another contractor to sample containerized waste; however, the following is recommended as a minimum procedure:

- For 55-gallon drums, collect a single discrete soil sample from at or near the centroid of the drum.

- For 8-cubic-yard roll-off bins, collect two discrete soil samples from at or near the centroids of each half of the bin.

- For 20-cubic-yard roll-off bins, collect four discrete soil samples from at or near the centroids of each of four roughly equal quadrants of the bin.

Undisturbed soil samples collected using hand-augering or similar equipment are preferred. Samples should not be collected from depths of less than 12 inches from the exposed surface of the waste. With BRC's concurrence, the discrete samples may be combined by equal volume into a single composite sample per waste container, provided VOCs are not a potential contaminant. The composite samples should be analyzed for the compounds considered likely to be present in accordance with the analytical methods listed in Table 4.

It is noted that if BRC classifies a waste as hazardous, the 90-day storage time will begin at the time of generation.

2.7 Waste Transportation and Disposal/Recycling

BRC will be responsible for arranging and coordinating the offsite transportation and disposal/recycling of wastes generated during the Phase II soil investigation and the related postdemolition activities. This section, therefore, is for information purposes only.

Waste manifests, whether hazardous or nonhazardous, will be completed by BRC or its subcontractor(s) and signed by an authorized BRC employee. Under no circumstances should any Ogden employee or Ogden subcontractor employee sign any hazardous or nonhazardous waste manifests. Transportation services will typically be provided by a BRC contractor. Wastes will only be transported to a BRC-approved disposal/ recycling facility. A list of current BRC-approved facilities is presented in Table 3.

SECTION 3
REMEDIATION-DERIVED WASTE MANAGEMENT PROCEDURES

This section outlines procedures for segregating and handling larger quantities of soil that may be generated during the site investigation and, more likely, during the related postdemolition activities (for postdemolition soil monitoring protocol, please refer to Appendix D). Figure 3 illustrates the waste generation and disposal/ treatment process in a flowchart. A matrix of waste quantities and approximate disposal/treatment costs is presented in Table 2. In the context of this SWMP, the term "large" refers to quantities of soil greater than 10 cubic yards, which cannot be handled efficiently using 55-gallon drums or roll-off bins. This section specifically pertains to larger quantities of IDW, such as cuttings and/or drill mud from large-diameter well borings and localized near-surface soil removal actions. The types of hazardous constituents are expected to be the same as discussed in Section 2.0, but quantities of soil are expected to be significantly larger.

3.1 SCAQMD Rule 1166 Considerations

SCAQMD Rule 1166 limits the emission of VOCs from impacted soils and must be considered and, if necessary, addressed prior to excavations to remove or otherwise remediate VOC-containing soil. The following procedure is recommended:

- Evaluate the results of the AOC-specific or other investigations to determine whether VOCs are likely to be present in excavated soil, even if the excavation is targeted to remove metals or other nonvolatile organic compounds. If VOCs are potentially present, proceed as described below.

- Use professional judgment to decide whether vapor suppression measures are likely to be required and plan accordingly. Vapor suppression measures could include spraying with water, spraying with foam, or simply covering with polyethylene sheeting.

- Notify SCAQMD by phone at (909) 396-2326 at least 24 hours prior to commencing the excavation. The notification information must include the facility owner, facility location, and the estimated start and finish dates. The information must also be faxed to SCAQMD at (909) 396-3342. SCAQMD may send an inspector to monitor some or all of the excavation activities.

- Monitor organic vapor concentrations in the breathing zone during the excavation, near the face of the excavation, and near the surface of any soil stockpiles. SCAQMD considers a measurement of 50 ppm or more of organic vapors at 3 inches from an excavation or stockpile surface to indicate VOC-impacted soil, thus triggering the requirement for vapor suppression measures. The OVA must be properly calibrated and the appropriate correction factor (if any) must be applied for the target VOC. The OVA readings, the times they were recorded, and the approximate reading locations will be documented.

- Employ vapor suppression methods as appropriate. The simplest methods are spraying the excavation and the excavated soil with water and/or covering excavated soil with 6-mil polyethylene sheeting. If polyethylene covers are used, they must be adequately weighted down with sandbags, old tires, etc.

- Rule 1166-required notifications will be made by the soil removal contractor.

3.2 Stockpile Considerations

It is likely that impacted soil will be temporarily stockpiled during the anticipated postdemolition, near-surface soil remediation program. Procedures for stockpiling soil will vary depending on the location and size of the excavation, the chemicals present, and the length of time the stockpile is likely to be temporarily stored. The following procedure is recommended as general guidance:

- Estimate stockpile quantities prior to excavation activities. Identify the chemicals of concern, the ultimate disposition of the stockpiled soil, and the length of time the stockpile is likely to be temporarily stored onsite.

- Discuss stockpile locations with BRC personnel (Scott Lattimore), mark the agreed upon location on a scaled site plan, and have the plan signed by an authorized BRC representative.

- For soil that will be stockpiled for 1 to 2 weeks and when no precipitation is likely, the soil may be stockpiled directly onto an asphalt- or (preferably) concrete-paved surface. The stockpile area will be delineated with wooden

barriers, traffic control cones or bollards, caution tape, or similar methods. The stockpile should be covered as necessary to comply with SCAQMD Rule 1166.

- For soil that will be stockpiled for longer periods of time or when precipitation is likely, additional measures should include encircling the stockpile with a berm of straw bales or a manufactured berm material to minimize runon or runoff. In addition, the stockpile should be covered with polyethylene sheeting whether or not the soil contains VOCs. The stockpile cover should be anchored to the berm such that direct precipitation runs off freely and is not impounded.

To the extent possible, the characterization of stockpiled waste will be based on the analysis of soil samples collected during the site investigation, i.e., prior to creating the stockpile. It is possible, however, that additional sampling and analysis may be required for profiling or other purposes. In the event that a soil stockpile must be sampled, the following procedure is recommended as a minimum standard:

- Collect a minimum of four discrete soil samples from stockpiles for the first 100 cubic yards of soil.

- Collect one additional soil sample per 100 cubic yards of stockpiled material between 100 and 1,000 cubic yards of soil.

- Collect one additional soil sample per 500 cubic yards of stockpiled material over 1,000 cubic yards.

Because stockpile geometry may vary considerably, professional judgment should be used in selecting discrete sampling locations with the objective of generating representative analytical data. Where possible, stockpiles should be divided into the appropriate number of sections or quadrants and samples collected from at or near the centroid of each quadrant. Undisturbed samples collected using hand-augering or similar equipment are preferred. Samples should not be collected from depths less than 18 inches from the exposed surface of the stockpile. Discrete samples should not be composited but, rather, should be analyzed for the compounds considered likely to be present in accordance with the analytical methods listed in Table 4.

3.3 CONCRETE/ASPHALT PAVING AND FOUNDATION SLABS

BRC anticipates that site investigations will identify localized areas of soil that must be removed or otherwise remediated prior to redevelopment. As a precursor to removal of these soils, the overlying concrete or asphalt paving will likely be saw-cut and removed. If the impacted soil is located beneath a building, the building's floor slab will also likely need to be saw-cut, broken, and removed. These activities could result in volumes of broken pavement and concrete that cannot be cost-effectively handled using the low-sided roll-off bins also used for smaller quantities (Section 2.2).

Prior to any activities likely to generate large quantities of asphalt or concrete, the volume and weight should be estimated based on the area to be disturbed. The findings of any site investigation (or other) in the area to be disturbed should be reviewed with BRC so that the nonhazardous classification of the asphalt and concrete can be supported. Two primary methods of handling large quantities of nonhazardous construction debris are envisioned:

1. Direct load and transport offsite for recycling
2. Stockpile onsite for onsite recycling or subsequent transport offsite

3.3.1 Direct Load with Offsite Transportation

Under this option, transportation in one or more end-dump trucks would be prearranged by or on behalf of BRC, as would acceptance at one or more approved recycling facilities. The asphalt and concrete would be broken in place and loaded directly onto trucks, thus avoiding "double handling." After completing the Bill of Lading documentation, the trucks would transport the material directly to an offsite crushing/recycling facility.

3.3.2 Stockpiling for Onsite Use or Offsite Transportation

Under this option, nonhazardous construction debris would be stockpiled in a predesignated location for onsite crushing/recycling and reuse or for later offsite transportation. Onsite crushing/recycling may be more cost-effective than the comparable offsite process because transportation is minimized and the recycled material

has economic value as road base or other engineered fill and could be used during redevelopment. Given the size of the paved areas at the Facility, it is probable that the demolition contractor may already have the necessary equipment onsite. Onsite stockpile and crushing locations would be approved in advance by BRC and would ideally be close enough to the generating location to avoid transloading. If transloading cannot be avoided, a direct load-and-haul procedure similar to that described in Section 3.3.1 is envisioned.

If onsite crushing is not possible or desirable (e.g., due to dust), construction debris could be stockpiled temporarily prior to transportation offsite. Again, temporary stockpile locations would be preapproved by BRC. Ideally, they would be located adjacent to the generating location to avoid unnecessary transportation.

3.4 Equipment Decontamination and Well Development Water

If large quantities of equipment decontamination and well development water are generated, containerization in 55-gallon drums and offsite disposal as hazardous waste may become cost-prohibitive. Two primary methods of handling large quantities of potentially impacted water are envisioned:

1. Consolidation into large tanks for bulk offsite disposal or treatment
2. Onsite treatment and discharge

3.4.1 Bulk Offsite Disposal/Treatment

Under this option, equipment decontamination water and well development/purge water would be transferred into one or more large tanks, probably 500-barrel Baker tanks or Frac tanks. Depending on the ultimate disposition, some segregation of waste streams may be prudent according to expected metal (especially Cr [VI]) and organic chemical content. Once a sufficient volume has been accumulated and sediments have been given time to settle out, clear water could be drawn or pumped from the top of the tank using a vacuum truck or similar equipment. The clear water could then be transported and treated at a suitable offsite facility without incurring the usually high surcharges for turbid or sediment-laden water, which require pretreatment. An allowance should be made for cleaning out the holding tank(s) at the end of the project and disposing of the accumulated sediment.

3.5 Aquifer Pumping Test Water

Pumping tests to estimate aquifer parameters often generate quantities of water too large to containerize and treat on a batch basis. Alternatives for handling pumping test water include, but are not necessarily limited to, direct discharge to the sanitary sewer system or treatment and direct discharge to the sanitary sewer or storm drain system.

The direct discharge of untreated groundwater to the sanitary/industrial sewer system may be possible, depending on the flow rate, the types and estimated concentrations of potentially hazardous constituents, and BRC's sewer discharge permit limitations. If permit conditions allow, this option would entail running a temporary polyvinyl chloride (PVC) pipeline from the extraction well to the nearest suitable inlet to the sewer.

If the discharge permit does not allow the discharge of groundwater into the sewer system, follow the procedure described in Section 3.4.1.

3.6 Large Quantities of Soil

As discussed earlier in this SWMP, relatively large quantities of soil may be generated during postdemolition removal actions. Soils containing VOCs may be subject to SCAQMD's Rule 1166, which precludes aeration/volatilization as a remediation option. Absent this option, potentially viable alternatives for handling relatively large quantities of soil include, but are not limited to, the following:

1. Onsite treatment
2. Bulk offsite disposal/recycling

The selection of either of these alternatives, and the appropriate process options for onsite treatment, will be on a case-by-case basis. The following descriptions are for conceptual, illustrative purposes only.

3.6.1 Onsite Treatment Options

Several options are available for the onsite treatment of impacted soil. These include low temperature thermal oxidation (LTTO), *ex situ* vapor extraction, and *ex situ* bioremediation.

LTTO would be appropriate for soil containing aromatic VOCs, aviation fuels, and other POLs. LTTO could also be used for soil containing chlorinated VOCs if the equipment incorporates appropriate off-gas treatment. SCAQMD-permitted, transportable LTTO systems are available from several vendors in the Los Angeles area. A typical arrangement includes onsite vendor assembly and operation of the LTTO system on a per-cubic-yard rate. However, a minimum of 5,000 cubic yards is typically required to make LTTO cost-effective. The impacted soil is typically loaded onto a conveyor that passes through a heated chamber, raising the temperature of the soil and driving off the organic chemicals. Dried soil is the end product. Cohesive soils, such as those expected to be encountered at the Facility, may require preprocessing to achieve a suitable size for efficient treatment. Moreover, dried cohesive soils require moisture conditioning prior to recompaction.

Ex situ vapor extraction would be appropriate for soil containing aromatic and/or chlorinated VOCs. A typical application involves arranging the impacted soil in a "windrow," which contains an array of perforated PVC pipes. When the windrow is complete, it is covered with polyethylene sheeting (typically 6-mil) to minimize volatilization to ambient air, which could violate SCAQMD's Rule 1166. Negative pressure is created inside the covered windrow using a blower or vacuum pump manifolded to the array of perforated PVC pipes. Negative pressure accelerates volatilization of VOCs from the soil matrix and removes them from the windrow via the blower. Off-gas treatment is required for the exhaust from the blower. The most common off-gas treatment option is vapor-phase granular activated carbon (VGAC). This type of *ex situ* vapor extraction system will require a permit from SCAQMD.

Ex situ bioremediation would be appropriate for soil containing aromatic VOCs, aviation fuels, and other POLs. Most processes involve the addition of water and nutrients to the impacted soil to stimulate naturally occurring bacteria in the soil. Other processes involve the addition of bacteria or enzymes, in addition to moisture and nutrients, to accelerate the naturally occurring bioremediation process. The addition of water and

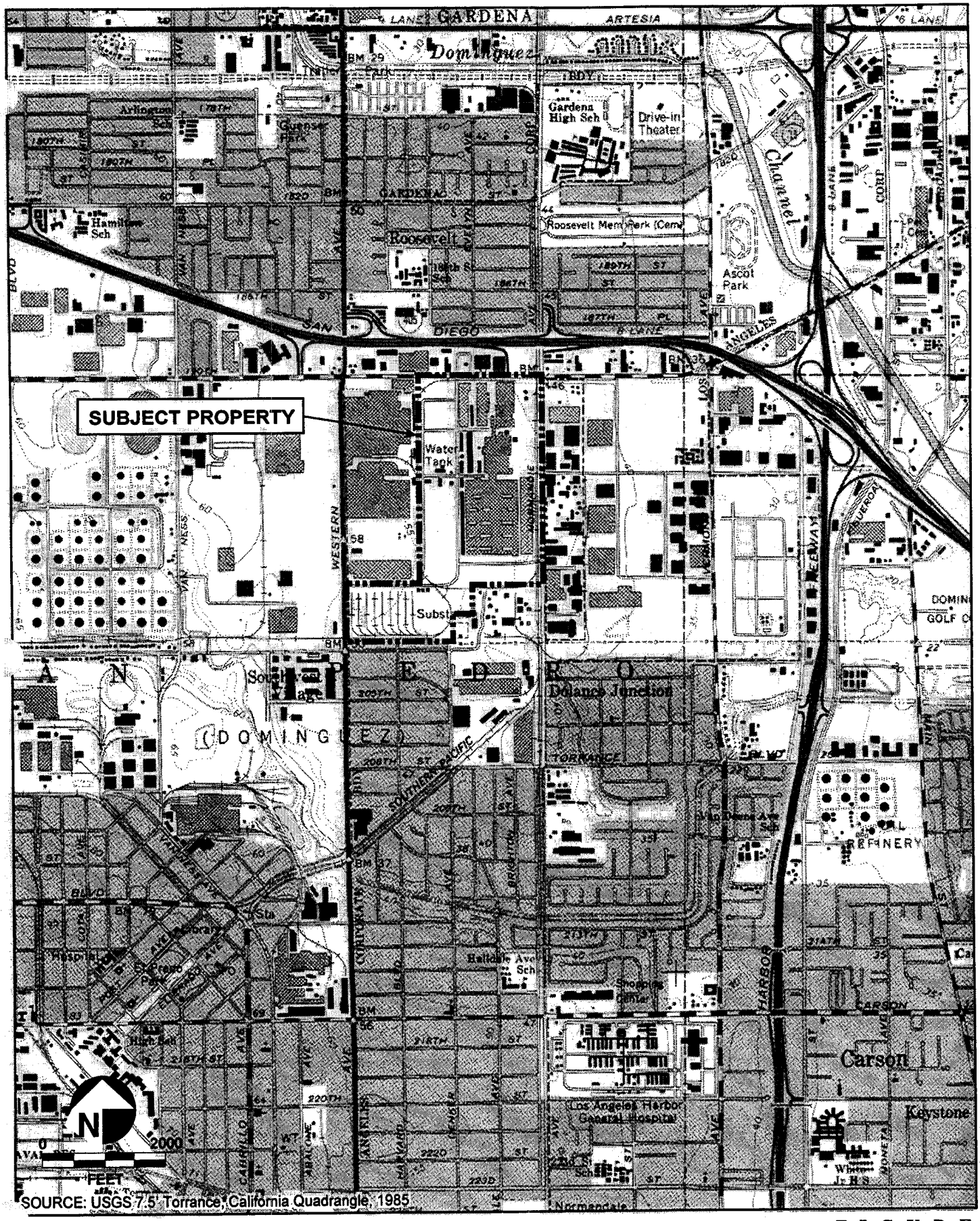
nutrients can take place in a land farming application, where the soil is spread out over a paved area and periodically sprayed and turned over. Because of the requirement for large areas of open space for the land farming process, however, an increasingly common method is to use a processing unit. These units are similar in concept to the LTTO described above except that instead of a heated chamber, the unit features mechanical agitators that mix the soil as the water and nutrients are added. The end process is a wetted soil that often must be dried before it can be used as backfill.

3.6.2 Bulk Offsite Disposal/Recycling

This option would be suitable for soil containing any of the chemicals likely to be encountered at the Facility. Logistically, it would be similar to the bulk disposal of nonhazardous construction debris described in Section 3.3. Quantities would be estimated in advance and arrangements for transportation and acceptance at a suitable disposal/recycling facility made in advance. Arrangements for acceptance could be based on a review of individual AOC investigation findings in the disturbed area. Current BRC-approved disposal/recycling facilities are listed in Table 3. Ideally, the soil would be direct-loaded into end-dump trucks to avoid double handling. If direct-loading is not possible, the soil could be temporarily stockpiled at one or more BRC-approved locations.

FIGURES

FIGURES



SOURCE: USGS 7.5' Torrance, California Quadrangle, 1985

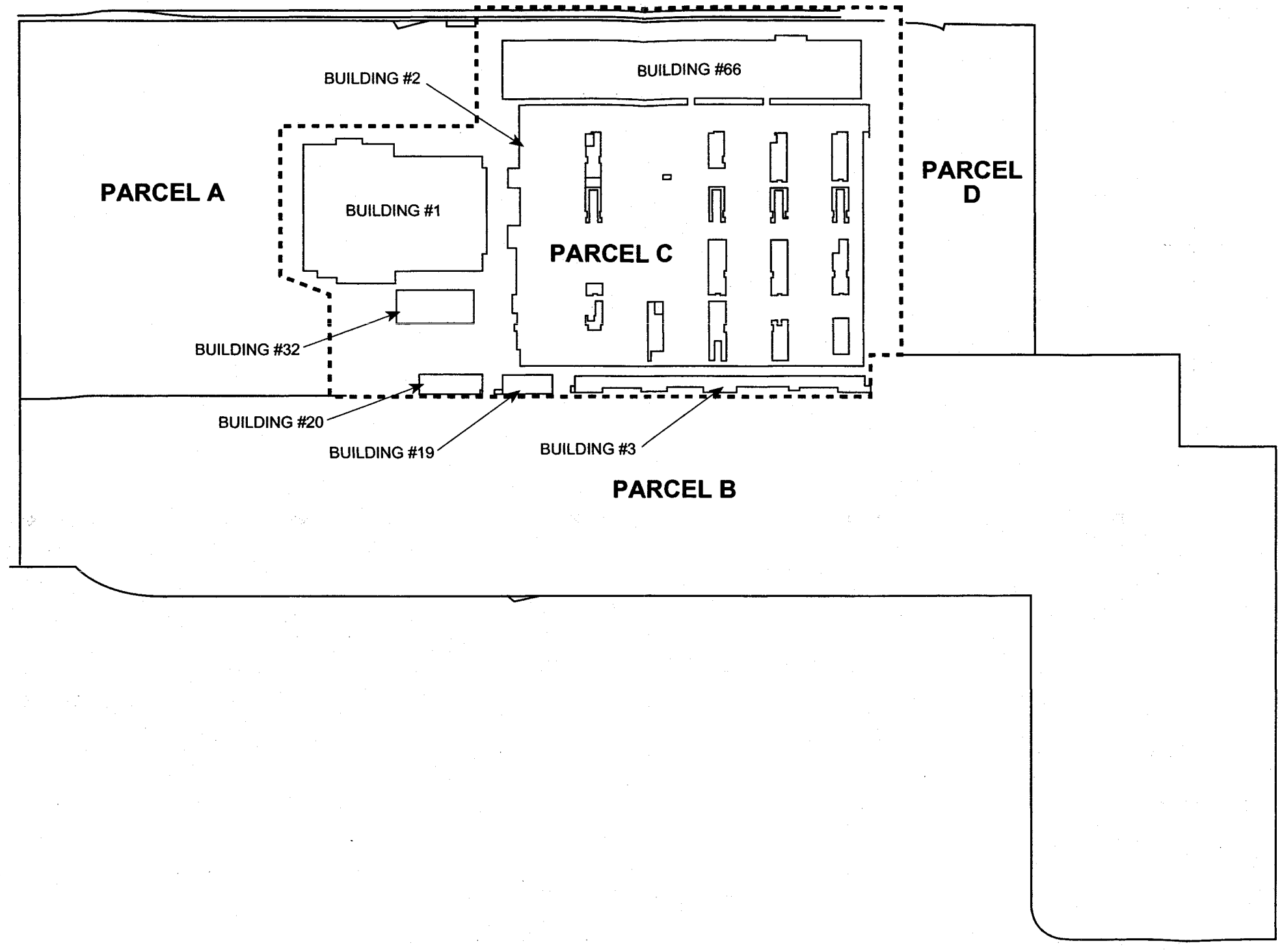
OGDEN

Subject Property Location
Boeing Realty Corporation, Former C-6 Facility
Los Angeles, California

FIGURE

1

Graphics/HazMat/Boeing C-6/Solid Waste Mgmt Plan/**Project Location.FH8**



SOURCE: Kennedy/Jenks Consultants, Sampling and Analysis Plan,
Boeing Realty Corporation s C-6 Facility-Parcel C, Los Angeles California, 16 August 2000

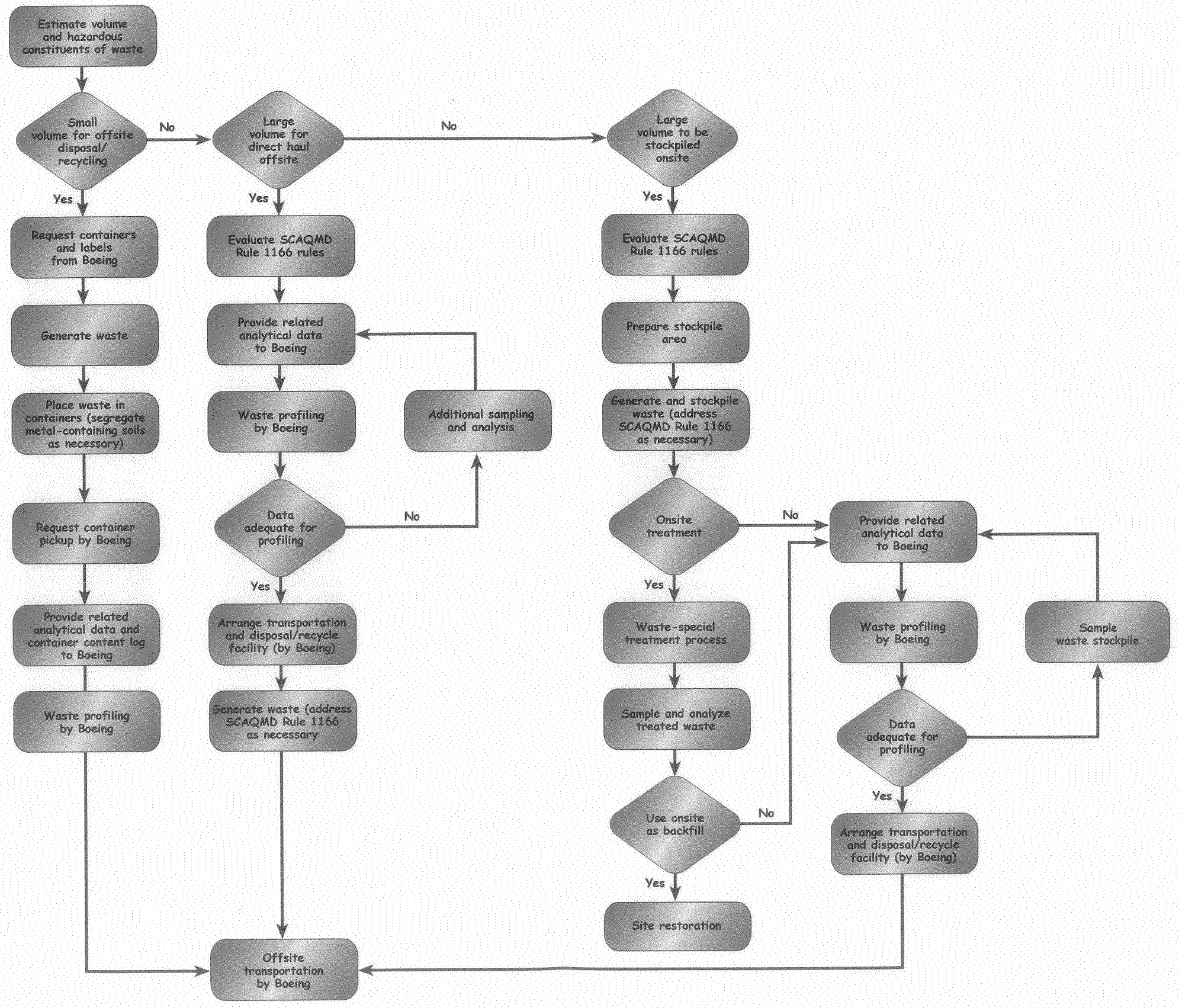
OGDEN

Site Plan
Boeing Realty Corporation, Former C-6 Facility
Los Angeles, California

FIGURE
2

GRAPHICS/Hazmat/Boeing C-6/Solid Waste Mgmt Plan/Site Plan Fig 2.Fh8

BOE-C6-0140425



OGDEN

Waste Characterization and Disposal Flowchart

FIGURE 3

GRAPHICS/Hazmat/Boeing C-6/Solid Waste Mgmt Plan/Waste Charact Flow.Fh8

BOE-C6-0140426

TABLES

TABLES

TABLE 1

TYPICAL WASTE QUANTITIES GENERATED DURING SOIL INVESTIGATION ACTIVITIES

INVESTIGATIVE TECHNIQUE	BORING DIAMETER (ft)	BORING DEPTH (ft bgs)	APPROXIMATE QUANTITY $ft^{3(1)}$	APPROXIMATE QUANTITY $lb^{(2)}$
Direct push	1.5	12	<0.25	<30
	1.5	25	<0.25	<30
	1.5	35	<0.25	<30
Augered borings	8	12	4.2	504
	8	25	8.7	1,044
	8	35	12.2	1,464

NOTES: (1) Does not include any allowance for bulking. Typical bulking factor is 1.5.
(2) Based on bulk density of 120 lb/ft^3.

ft = feet
ft^3 = cubic feet
lb = pound
bgs = below ground surface

TABLE 2

WASTE DISPOSAL/TREATMENT MATRIX

Boeing Realty Corporation, Former C-6 Facility, Torrance, California

WASTE DESCRIPTION	CONTAINER TYPE	ONSITE TREATMENT PROCESS	TRANSPORTATION COST	DISPOSAL COST	TREATMENT COST ($/CY)	OVERALL COST ($/CY)	DISPOSAL/RECYCLE FACILITY
Construction Debris (nonhazardous)	8 CY low-sided roll-off bin	NF	$250 round trip (2 bins)	$25 per bin	N/A	$17	Any local facility
	Bulk (end-dump truck)	NF	$250 round trip	$50 per truck	N/A	$17	Any local facility
TPH-containing soil	55-gallon drum	NF	$450 round trip (for 60 drums)	$75 per drum	N/A	$404	TPS Technologies, Adelanto, CA
	8 CY roll-off bin	NF	$450 round trip (2 bins)	$25 per ton	N/A	$80	TPS Technologies, Adelanto, CA
	20 CY roll-off bin	NF	$450 round trip (1 bin)	$25 per ton	N/A	$80	TPS Technologies, Adelanto, CA
	Bulk (end-dump truck)	NF	$450 round trip	$25 per ton	N/A	$77	TPS Technologies, Adelanto, CA
	Stockpile	Low-temperature thermal desorption	N/A	N/A	$40-$70	$40-$70	
	Stockpile	*Ex situ* vapor extraction	N/A	N/A	$20-$50	$20-$50	
	Stockpile	*Ex situ* bioremediation	N/A	N/A	$30-$80	$30-$80	
Non-RCRA, VOC-containing soil	55-gallon drum	NF	$780 round trip (for 60 drums)	$48 per drum	N/A	$299	Waste Management, Kettleman Hills, CA
	8 CY roll-off bin	NF	$780 round trip (2 bins)	$40 per ton	N/A	$133	Waste Management, Kettleman Hills, CA
	20 CY roll-off bin	NF	$780 round trip (1 bin)	$40 per ton	N/A	$133	Waste Management, Kettleman Hills, CA
	Bulk (end-dump truck)	NF	$780 round trip	$40 per ton	N/A	$127	Waste Management, Kettleman Hills, CA
	Stockpile	Low-temperature thermal desorption	N/A	N/A	$50-$80	$50-$80	
	Stockpile	*Ex situ* vapor extraction	N/A	N/A	$20-$50	$20-$50	
RCRA soil with VOCs (within treatment standard)	55-gallon drum	NF	$780 round trip (for 60 drums)	$60 per drum	N/A	$358	Waste Management, Kettleman Hills, CA
	8 CY roll-off bin	NF	$780 round trip (2 bins)	$60 per ton	N/A	$163	Waste Management, Kettleman Hills, CA
	20 CY roll-off bin	NF	$780 round trip (1 bin)	$60 per ton	N/A	$163	Waste Management, Kettleman Hills, CA
	Bulk (end-dump truck)	NF	$780 round trip	$60 per ton	N/A	$157	Waste Management, Kettleman Hills, CA
	Stockpile	*Ex situ* vapor extraction	N/A	N/A	$20-$50	$20-$50	
Non-RCRA, metal-containing soil	55-gallon drum	NF	$780 round trip (for 60 drums)	$48 per drum	N/A	$299	Waste Management, Kettleman Hills, CA
	8 CY roll-off bin	NF	$780 round trip (2 bins)	$40 per ton	N/A	$133	Waste Management, Kettleman Hills, CA
	20 CY roll-off bin	NF	$780 round trip (1 bin)	$40 per ton	N/A	$133	Waste Management, Kettleman Hills, CA
	Bulk (end-dump truck)	NF	$780 round trip	$40 per ton	N/A	$127	Waste Management, Kettleman Hills, CA
RCRA soil with metals (above treatment standard)	55-gallon drum	NF	$780 round trip (for 60 drums)	$108 per drum	N/A	$593	Waste Management, Kettleman Hills, CA
	8 CY roll-off bin	NF	$780 round trip (2 bins)	$160 per ton	N/A	$313	Waste Management, Kettleman Hills, CA
	20 CY roll-off bin	NF	$780 round trip (1 bin)	$160 per ton	N/A	$313	Waste Management, Kettleman Hills, CA
	Bulk (end-dump truck)	NF	$780 round trip	$160 per ton	N/A	$307	Waste Management, Kettleman Hills, CA
PCB-containing soil	55-gallon drum	NF	$780 round trip (for 60 drums)	$60 per drum	N/A	$358	Waste Management, Kettleman Hills, CA
	8 CY roll-off bin	NF	$780 round trip (2 bins)	$60 per ton	N/A	$163	Waste Management, Kettleman Hills, CA
	20 CY roll-off bin	NF	$780 round trip (1 bin)	$60 per ton	N/A	$163	Waste Management, Kettleman Hills, CA

Note: Disposal and transportation costs based on average commercial rates available for August 2000.
CY = cubic yard
N/A = not applicable
NF = not feasible
PCB = polychlorinated biphenyl
RCRA = Resource Conservation and Recovery Act
TPH = total petroleum hydrocarbons
VOC = volatile organic compound

TABLE 3

BRC-APPROVED DISPOSAL/RECYCLING FACILITIES

TYPE OF WASTE	APPROVED FACILITY
Construction debris	N/A
Nonhazardous soil	TPS, Adelanto, CA
Hazardous soil	Waste Management, Kettleman Hills, CA Safety Kleen, Westmorland, CA
Equipment decontamination water	DK Environmental, Torrance, CA
Used PPE	N/A

N/A = Not Applicable
PPE = personal protective equipment

TABLE 4

ANALYTICAL METHODS FOR WASTE CHARACTERIZATION

PARAMETER/TARGET COMPOUND(S)	ANALYTICAL METHOD
Ignitability	USEPA 1010/1020
Corrosivity (pH)	USEPA 9045
Reactivity	SW-846
Toxicity	Toxicity Characteristic Leaching Procedure (TCLP)
Aromatic hydrocarbons	USEPA 8020
Extractable hydrocarbons	USEPA 8015 (modified)
Chlorinated volatile organic compounds (VOCs)	USEPA 8260
Semivolatile organic compounds (SVOCs)	USEPA 8270
1,4-Dioxane	USEPA 8270
Polychorinated biphenyls (PCBs)	USEPA 8080
Title 26 metals	USEPA 6010/7000 Series
RCRA metals	USEPA 6010/7000 Series
Hexavalent chromium	USEPA 7196
Soluble metals (California)	Waste Extraction Test (WET)
Pesticides	USEPA 8080

RCRA = Resource Conservation and Recovery Act
USEPA = United States Environmental Protection Agency

APPENDIX A

APPENDIX A

HAZARDOUS WASTE IDENTIFICATION

United States Environmental Protection Agency | Solid Waste and Emergency Response (5305W) | EPA530-R-99-051 PB2000-101 891 February 2000

RCRA, Superfund & EPCRA Hotline Training Module

Introduction to:

Hazardous Waste Identification
(40 CFR Part 261)

Updated October 1999

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Local number (within DC area)	(703) 412-9810
National toll-free for the hearing impaired (TDD)	(800) 553-7672

The Hotline is open from 9 am to 6 pm Eastern Time,
Monday through Friday, except for federal holidays.

HAZARDOUS WASTE IDENTIFICATION

CONTENTS

1. INTRODUCTION

"Is my waste a hazardous waste regulated under the Resource Conservation and Recovery Act (RCRA)?" This is one of the most common and basic questions the Hotline receives and is the key to the RCRA hazardous waste program. If something is not a hazardous waste, it is not regulated under RCRA. Proper identification of a hazardous waste can be a difficult and confusing task, as the RCRA regulations establish a complex definition of the term "hazardous waste." To help make sense of what is and is not a hazardous waste, this module presents the steps involved in the process of identifying, or "characterizing," a hazardous waste.

While introducing the entire hazardous waste identification process, this module will focus on the final steps, the definition of a hazardous waste. The other steps in the process, including the definition of solid waste and the solid and hazardous waste exclusions will be discussed in other modules.

After reading this module, you will be able to explain the hazardous waste identification process and the definition of hazardous waste, and be familiar with the following concepts:

- Hazardous waste listings
- Hazardous waste characteristics
- The "mixture" and "derived-from" rules
- The "contained-in" policy
- The Hazardous Waste Identification Rules (HWIR).

2. REGULATORY OVERVIEW

What is a hazardous waste? In its most basic form, the answer to that question can be quite simple. A hazardous waste is a waste with a chemical composition or other properties that make it capable of causing illness, death, or some other harm to humans and other life forms when mismanaged or released into the environment. Developing a regulatory program that ensures the safe handling of such dangerous wastes, however, demands a far more precise definition of the term. EPA therefore created hazardous waste identification regulations that outline a process to determine whether any particular material is a hazardous waste for the purposes of RCRA.

2.1 HAZARDOUS WASTE IDENTIFICATION PROCESS

Proper hazardous waste identification is essential to the success of the hazardous waste management program. The RCRA regulations at 40 CFR §262.11 require that any person who produces or generates a waste must determine if that waste is hazardous. In doing so, §262.11 presents the steps in the hazardous waste identification process:

- Is the waste a "solid waste"?
- Is the waste specifically excluded from the RCRA regulations?
- Is the waste a "listed" hazardous waste?
- Does the waste exhibit a characteristic of hazardous waste?

When faced with the question of whether or not a waste is regulated as hazardous under RCRA, turn to §262.11. This regulation will remind you of the four steps in the RCRA hazardous waste identification process.

IS THE WASTE A SOLID WASTE?

Hazardous waste identification begins with an obvious point: in order for any material to be a hazardous waste, it must first be a waste. But, deciding whether an item is or is not a waste is not always easy. For example, a material (like an aluminum can) that one person discards could seem valuable to another person who recycles that material. EPA developed a set of regulations to assist in determining whether a material is a waste. RCRA uses the term "solid waste" in place of the common term "waste." Under RCRA, the term "solid waste" means any waste, whether it is a solid, semisolid, or liquid. The first section of the RCRA hazardous waste identification regulations focuses on the definition of solid waste. For this module, you need only understand in general terms the role that the definition of solid waste plays in the RCRA hazardous waste identification process. Another module, Definition of Solid Waste and Hazardous Waste Recycling, explains the definition of solid waste in greater detail.

IS THE WASTE EXCLUDED?

Only a small fraction of all RCRA solid wastes actually qualify as hazardous wastes. At first glance, one would imagine that distinguishing between hazardous and nonhazardous wastes is a simple matter of chemical and toxicological analysis. Other factors must be considered, however, before evaluating the actual hazard that a waste's chemical composition poses. Regulation of certain wastes may be impractical, unfair, or otherwise undesirable, regardless of the hazards they pose. For instance, household waste can contain dangerous chemicals, like solvents and pesticides, but making households subject to the strict RCRA waste management regulations would create a number of practical problems. Congress and EPA exempted or excluded certain wastes, like household wastes, from the hazardous waste definition and regulations. Determining whether or not a waste is excluded or exempted from hazardous waste regulation is the second step in the RCRA hazardous waste identification process. Only after determining that a solid waste is not somehow excluded from hazardous waste regulation should the analysis proceed to evaluate the actual chemical hazard that a waste poses. The module entitled Solid and Hazardous Waste Exclusions explains which wastes are excluded from hazardous waste regulation.

IS THE WASTE A LISTED HAZARDOUS WASTE, OR DOES IT EXHIBIT A CHARACTERISTIC?

The final steps in the hazardous waste identification process determine whether a waste actually poses a sufficient chemical or physical hazard to merit regulation. These steps in the hazardous waste identification process involve evaluating the waste in light of the regulatory definition of hazardous waste. The remainder of this module explains the definition of hazardous waste in detail.

2.2 DEFINITION OF HAZARDOUS WASTE

A discussion of the definition of hazardous waste should begin with Congress' original statutory definition of the term. RCRA §1004(5) defines hazardous waste as:

> A solid waste, or combination of solid waste, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (a) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

This broad statutory definition provides a general indication of which wastes Congress intended to regulate as hazardous, but it obviously does not provide the clear

distinctions necessary for industrial waste handlers to determine whether their wastes pose a sufficient threat to warrant regulation or not. Congress instructed EPA to develop more specific criteria for defining hazardous waste. There are therefore two definitions of hazardous waste under the RCRA program: a statutory definition and a regulatory definition. The statutory definition cited above is seldom used today. It served primarily as a general guideline for EPA to follow in developing the regulatory definition of hazardous waste. The regulatory definition is an essential element of the current RCRA program. It precisely identifies which wastes are subject to RCRA waste management regulations.

Congress asked EPA to fulfill the task of developing a regulatory definition of hazardous waste by using two different mechanisms: by listing certain specific wastes as hazardous and by identifying characteristics which, when present in a waste, make it hazardous. Following its statutory mandate, EPA developed a regulatory definition of hazardous waste that incorporates both listings and characteristics.

HAZARDOUS WASTE LISTINGS

A hazardous waste listing is a narrative description of a specific type of waste that EPA considers dangerous enough to warrant regulation. Hazardous waste listings describe wastes from various industrial processes, wastes from specific sectors of industry, or wastes in the form of specific chemical formulations. Before developing a hazardous waste listing, EPA thoroughly studies a particular wastestream and the threat it can pose to human health and the environment. If the waste poses enough of a threat, EPA includes a precise description of that waste on one of the hazardous waste lists in the regulations. Thereafter, any waste fitting that narrative listing description is considered hazardous, regardless of its chemical composition or any other potential variable. For example, one of the current hazardous waste listings reads as: "API separator sludge from the petroleum refining industry." An API separator is a device commonly used by the petroleum refining industry to separate contaminants from refinery wastewaters. After studying the petroleum refining industry and typical sludges from API separators, EPA decided these sludges were dangerous enough to warrant regulation as hazardous waste under all circumstances. The listing therefore designates all petroleum refinery API separator sludges as hazardous. Chemical composition or other factors about a specific sample of API separator sludge are not relevant to its status as hazardous waste under the RCRA program.

Using listings to define hazardous wastes presents certain advantages and disadvantages. One advantage is that listings make the hazardous waste identification process easy for industrial waste handlers. Only knowledge of a waste's origin is needed to determine if it is listed; laboratory analysis is unnecessary. By comparing any waste to narrative listing descriptions, one can easily determine whether or not the waste is hazardous. EPA's use of listings also presents certain disadvantages. For

example, listing a waste as hazardous demands extensive study of that waste by EPA. EPA lacks the resources to investigate the countless types of chemical wastes produced in the United States — the hazardous waste listings simply cannot address all dangerous wastes. Another disadvantage of the hazardous waste listings is their lack of flexibility. Listings designate a waste as hazardous if it falls within a particular category or class. The actual composition of the waste is not a consideration as long as the waste matches the appropriate listing description. For instance, some API separator sludges from petroleum refining might contain relatively few hazardous constituents and pose a negligible risk to human health and the environment. Such sludges are still regulated as hazardous, however, because the listing for this wastestream does not consider the potential variations in waste composition. Thus, the hazardous waste listings can unnecessarily regulate some wastes that do not pose a significant health threat. It is also possible for industries to substantially change their processes so that wastes would no longer meet a listing description in spite of the presence of hazardous constituents. The hazardous waste characteristics provide an important complement to listings by addressing most of the shortcomings of the listing methodology of hazardous waste identification.

HAZARDOUS WASTE CHARACTERISTICS

A hazardous waste characteristic is a property which, when present in a waste, indicates that the waste poses a sufficient threat to merit regulation as hazardous. When defining hazardous waste characteristics, EPA does not study particular wastestreams from specific industries. Instead, EPA asks the question, "what properties or qualities can a waste have which cause that waste to be dangerous?" For example, EPA found that ignitability, or the tendency for a waste to easily catch fire and burn, is a dangerous property. Thus, ignitability is one of the hazardous waste characteristics and a waste displaying that property is regulated as hazardous, regardless of whether the waste is listed. When defining hazardous waste characteristics, EPA identifies, where practicable, analytical tests capable of detecting or demonstrating the presence of the characteristic. For instance, EPA regulations reference a laboratory flash point test to be used when deciding if a liquid waste is ignitable. Whether or not a waste displays a hazardous characteristic generally depends on how it fares in one of the characteristics tests. Therefore, the chemical makeup or other factors about the composition of a particular waste typically determine whether or not it tests as hazardous for a characteristic.

Using characteristics to define hazardous wastes presents certain advantages over designating hazardous wastes by listings. One advantage is that hazardous characteristics and the tests used to evaluate their presence have broad applicability. Once EPA has defined a characteristic and selected a test for use in identifying it, waste handlers can evaluate any wastestream to see if it is classified as a hazardous waste. Furthermore, use of characteristics can be a more equitable way of designating wastes

as hazardous. Instead of categorizing an entire group of wastes as hazardous, characteristics allow a waste handler to evaluate each waste sample on its own merits and classify it according to the actual danger it poses. Aware of these advantages, EPA originally planned to use characteristics as the primary means of identifying hazardous waste. EPA hoped to define and select test methods for identifying all hazardous characteristics, including organic toxicity, mutagenicity (the tendency to cause mutations), teratogenicity (the tendency to cause defects in offspring), bioaccumulation potential, and phytotoxicity (toxicity to plants). EPA encountered problems, however, when trying to develop regulatory definitions of these properties. One primary problem was that no straightforward testing protocols were available for use in determining if a waste possessed any of these characteristics. For example, deciding if a particular wastestream poses an unacceptable cancer risk demands extensive laboratory experimentation. Requiring such analysis on a routine basis from industrial waste handlers would be impractical. Therefore, EPA developed a hazardous waste definition that relies on both listings and characteristics to define hazardous wastes.

2.3 LISTED HAZARDOUS WASTES

EPA has studied and listed as hazardous hundreds of specific industrial wastestreams. These wastes are described or listed on four different lists that are found in the regulations at Part 261, Subpart D. These four lists are:

- The F list – The F list designates as hazardous particular wastes from certain common industrial or manufacturing processes. Because the processes producing these wastes can occur in different sectors of industry, the F list wastes are known as wastes from nonspecific sources. The F list is codified in the regulations at §261.31.

- The K list – The K list designates as hazardous particular wastestreams from certain specific industries. K list wastes are known as wastes from specific sources. The K list is found at §261.32.

- The P list and the U list – These two lists are similar in that both list as hazardous pure or commercial grade formulations of certain specific unused chemicals. Both the P list and U list are codified in §261.33.

These four lists each designate anywhere from 30 to a few hundred wastestreams as hazardous. Each waste on the lists is assigned a waste code consisting of the letter associated with the list followed by three numbers. For example, the wastes on the F list are assigned the waste codes F001, F002, and so on. These waste codes are an important part of the RCRA regulatory system. Assigning the correct waste code to a waste has important implications for the management standards that apply to the waste.

LISTING CRITERIA

Before listing any waste as hazardous, the Agency developed a set of criteria to use as a guide when determining whether or not a waste should be listed. These listing criteria provide a consistent frame of reference when EPA considers listing a wastestream. Remember that EPA only uses these criteria when evaluating whether to list a waste: the listing criteria are not used by waste handlers, who refer to the actual hazardous waste lists for hazardous waste identification purposes. There are four different criteria upon which EPA may base its determination to list a waste as hazardous. These criteria are codified in Part 261, Subpart B. Note that these four criteria do not directly correspond to the four different lists of hazardous waste. The four criteria why EPA may list a waste are:

- The waste typically contains harmful chemicals, and other factors indicate that it could pose a threat to human health and the environment in the absence of special regulation. Such wastes are known as toxic listed wastes.

- The waste contains such dangerous chemicals that it could pose a threat to human health and the environment even when properly managed. Such wastes are known as acutely hazardous wastes.

- The waste typically exhibits one of the four characteristics of hazardous waste described in the hazardous waste identification regulations (ignitability, corrosivity, reactivity, toxicity).

- EPA has cause to believe that, for some other reason, the waste typically fits within the statutory definition of hazardous waste developed by Congress.

EPA may list a waste as hazardous for any and all of the above reasons. The majority of listed wastes fall into the toxic waste category. To decide if a waste should be a toxic listed waste, EPA first determines whether it typically contains harmful chemical constituents. Appendix VIII of Part 261 contains a list of chemical compounds or elements which scientific studies show to have toxic, carcinogenic, mutagenic, or teratogenic effects on humans or other life forms. If a waste contains chemical constituents found on the Appendix VIII list, EPA then evaluates 11 other factors to determine if the wastestream is likely to pose a threat in the absence of special restrictions on its handling. These additional considerations include a risk assessment and study of past cases of damage caused by the waste.

Acutely hazardous wastes are the second most common type of listed waste. EPA designates a waste as acutely hazardous if it contains Appendix VIII constituents that

scientific studies show to be fatal to humans or animals in low doses. In a few cases, acutely hazardous wastes contain no Appendix VIII constituents, but are extremely dangerous for another reason. An example is the listed waste P081, which designates unused discarded formulations of nitroglycerine as acutely hazardous. Although nitroglycerine is not an Appendix VIII hazardous constituent, wastes containing unused nitroglycerine are so unstable that they pose an acute hazard. The criteria for designating a waste as acutely hazardous require only that EPA consider the typical chemical makeup of the wastestream. EPA is not required to study other factors, such as relative risk and evidence of harm, when listing a waste as acutely hazardous.

To indicate its reason for listing a waste, EPA assigns a hazard code to each waste listed on the F, K, P, and U lists. These hazard codes are listed below. The last four hazard codes apply to wastes that have been listed because they typically exhibit one of the four regulatory characteristics of hazardous waste. You will learn more about the four characteristics of hazardous waste. The hazard codes indicating the basis for listing a waste are:

Toxic Waste	(T)
Acute Hazardous Waste	(H)
Ignitable Waste	(I)
Corrosive Waste	(C)
Reactive Waste	(R)
Toxicity Characteristic Waste	(E)

The hazard codes assigned to listed wastes affect the regulations that apply to handling the waste. For instance, acute hazardous wastes accompanied by the hazard code (H) are subject to stricter management standards than most other wastes.

THE F LIST: WASTES FROM NONSPECIFIC SOURCES

The F list designates as hazardous particular wastestreams from certain common industrial or manufacturing processes. F list wastes usually consist of chemicals that have been used for their intended purpose in an industrial process. That is why F list wastes are known as "manufacturing process wastes." The F list wastes can be divided into seven groups, depending on the type of manufacturing or industrial operation that creates them. The seven categories of F-listed wastes are:

- Spent solvent wastes (F001 - F005)
- Wastes from electroplating and other metal finishing operations (F006 - F012, F019)
- Dioxin-bearing wastes (F020 - F023 and F026 - F028)
- Wastes from the production of certain chlorinated aliphatic hydrocarbons (F024, F025)
- Wastes from wood preserving (F032, F034, and F035)

- Petroleum refinery wastewater treatment sludges (F037 and F038)
- Multisource leachate (F039).

Spent Solvent Wastes

Waste codes F001 - F005 apply to wastestreams from the use of certain common organic solvents. Solvents are chemicals with many uses, although they are most often used in degreasing or cleaning. The solvents covered by the F listings are commonly used in industries ranging from mechanical repair to dry cleaning to electronics manufacturing. EPA decided that only certain solvents used in certain ways produce wastestreams that warrant a hazardous waste listing. Therefore, a number of key factors must be evaluated in order to determine whether the F001 - F005 waste codes apply to a particular waste solvent. First, one or more of the 31 specific organic solvents designated in the F001 - F005 listing description must have been used in the operation that created the waste. Second, the listed solvent must have been used in a particular manner — it must have been used for its "solvent properties," as EPA defines that expression. Finally, EPA decided that only a wastestream created through use of concentrated solvents should be listed. Thus, the concentration of the solvent formulation or product before its use in the process that created the waste is also a factor in determining the applicability of the F001 - F005 listing.

The F001 - F005 spent solvent listings provide a good illustration of a principle common to all listed hazardous wastes. To determine whether a waste qualifies as listed, knowledge of the process that created the waste is essential, while information about the waste's chemical composition is often irrelevant. For example, the F005 listing description can allow two different wastes with identical chemical contents to be regulated differently because of subtle differences in the processes that created the wastes. A waste made up of toluene (an F005 solvent) and paint is listed if the toluene has been used to clean the paint from brushes or some other surface. A waste with the same chemical composition is not F005 if the toluene has been used as an ingredient (such as a thinner) in the paint. EPA considers use as a cleaner to be "use as a solvent;" use as an ingredient does not qualify as solvent use. As you can see, knowledge of the process that created a waste is the key in evaluating whether a waste can be a hazardous spent solvent or other listed hazardous waste.

Wastes from Electroplating and Other Metal-Finishing Operations

The listed hazardous wastes F006 - F012 and F019 are wastes commonly produced during electroplating and other metal finishing operations. Diverse industries use electroplating and other methods to change the surface of metal objects in order to enhance the appearance of the objects, make them more resistant to corrosion, or impart some other desirable property to them. Industries involved in plating and metal finishing range from jewelry manufacture to automobile production. A variety of techniques can be used to amend a metal's surface. For example, electroplating uses

electricity to deposit a layer of a decorative or protective metal on the surface of another metal object. Chemical conversion coating also amends the surface of a metal, but does so by chemically converting (without use of electricity) a layer of the original base metal into a protective coating. Because each of these processes produces different types of wastes, EPA only designated wastes from certain metal-finishing operations as hazardous. The first step in determining whether one of the F006-F012 or F019 listings applies to a waste is identifying the type of metal finishing process involved in creating the waste:

- F006 - F009 listings only apply to wastes from electroplating operations
- F010 - F012 listings only apply to wastes from metal heat treating operations
- The F019 listing only applies to wastes from chemical conversion coating of aluminum.

Dioxin-Bearing Wastes

The listed wastes F020 - F023 and F026 - F028 are commonly known as the "dioxin-bearing wastes." These listings describe a number of wastestreams that EPA believes are likely to contain dioxins, which are considered to be among the most dangerous known chemical compounds. The dioxin listings apply primarily to manufacturing process wastes from the production of specific pesticides or specific chemicals used in the production of pesticides. The F027 listing deserves special notice because it does not apply to used manufacturing wastes. It applies only to certain unused pesticide formulations. F027 is in fact the only listing on the F list or K list that describes an unused chemical rather than an industrial wastestream consisting of chemicals that have served their intended purpose. With the exception of F028, all of the dioxin-bearing wastes are considered acute hazardous wastes and are designated with the hazard code (H). These wastes are therefore subject to stricter management standards than other hazardous wastes.

Wastes from the Production of Certain Chlorinated Aliphatic Hydrocarbons

The F024 and F025 listings designate as hazardous certain wastestreams produced in the manufacture of chlorinated aliphatic hydrocarbons. These listings stand out on the F list (the list of wastes from nonspecific sources) because they focus on wastes from a very narrow industrial sector. Many other wastestreams from the manufacture of organic chemicals are listed on the K list, the list of wastes from specific sources.

Wood Preserving Wastes

The F032, F034, and F035 listings apply to certain wastes from wood preserving operations. Most wood used for construction or other non-fuel applications is chemically treated to slow the deterioration caused by decay and insects. Such chemical treatment is especially evident in telephone poles, railroad cross ties, and other wood

products prepared to withstand the rigors of outdoor use. Wood preservation typically involves coating lumber with pentachlorophenol, creosote, or preservatives containing arsenic or chromium. The wood preserving process creates a number of common wastestreams containing these chemicals. For example, once wood has been treated with a preservative, it is placed in a storage yard where excess preservative drips from the lumber. The F032, F034, and F035 listings designate this preservative drippage as listed hazardous waste. These listings also apply to a variety of other residues from wood preserving. Whether the F032, F034, or F035 listings apply to a particular wood preserving waste depends entirely on the type of preservative used at the facility. Waste from wood preservation using pentachlorophenol is F032, waste from use of creosote is F034, and waste from treating wood with arsenic or chromium is F035. The K List also includes a waste code, K001, that applies to some wood preserving wastes.

Petroleum Refinery Wastewater Treatment Sludges

The F037 and F038 listings apply to specific wastestreams from petroleum refineries. The petroleum refining process typically creates large quantities of contaminated wastewater. Before this wastewater can be discharged to a river or sewer, it must be treated to remove oil, solid material, and chemical pollutants. Gravity provides a simple way of separating these pollutants from refinery wastewaters. Over time, solids and heavier pollutants precipitate from wastewaters to form a sludge. Other less dense pollutants accumulate on the surface of wastewaters, forming a material known as float. These gravitational separation processes can be encouraged through chemical or mechanical means. The F037 listing applies to the sludges and float created by gravitational treatment of petroleum refinery wastewaters. The F038 listing applies to sludges and float created during the chemical or physical treatment of refinery wastewaters. The K List also includes waste codes for certain petroleum wastestreams generated by the petroleum refining industry. These waste codes are K048 through K052 and K169 through K172.

Multisource Leachate

The F039 listing applies to multisource leachate, the liquid material that accumulates at the bottom of a hazardous waste landfill. Understanding the natural phenomenon known as leaching is essential to understanding a number of key RCRA regulations. Leaching occurs when liquids such as rainwater filter through soil or buried materials, such as wastes placed in a landfill. When this liquid comes in contact with buried wastes, it leaches or draws chemicals out of those wastes. This liquid (called leachate) can then carry the leached chemical contaminants further into the ground, eventually depositing them elsewhere in the subsurface or in groundwater. The leachate that percolates through landfills, particularly hazardous waste landfills, usually contains high concentrations of chemicals, and is often collected to minimize the potential that it may enter the subsurface environment and contaminate soil or groundwater. This leachate that percolates through hazardous waste landfills and other buried hazardous waste is designated as F039.

THE K LIST: WASTES FROM SPECIFIC SOURCES

The K list of hazardous wastes designates particular wastes from specific sectors of industry and manufacturing as hazardous. The K list wastes are therefore known as wastes from specific sources. Like F list wastes, K list wastes are manufacturing process wastes. They contain chemicals that have been used for their intended purpose. To determine whether a waste qualifies as K-listed, two primary questions must be answered. First, is the facility that created the waste within one of the industrial or manufacturing categories on the K list? Second, does the waste match one of the specific K list waste descriptions? The 13 industries that can generate K list wastes are:

- Wood preservation
- Inorganic pigment manufacturing
- Organic chemicals manufacturing
- Inorganic chemicals manufacturing
- Pesticides manufacturing
- Explosives manufacturing
- Petroleum refining
- Iron and steel production
- Primary aluminum production
- Secondary lead processing
- Veterinary pharmaceuticals manufacturing
- Ink formulation
- Coking (processing of coal to produce coke, a material used in iron and steel production).

Remember that not all wastes from these 13 industries are hazardous, only those specifically described in the detailed K list descriptions.

Previously, the K list included waste codes for 17 different industries. However, EPA revoked the K waste codes applicable to the wastestreams in the primary copper, primary lead, primary zinc, and ferroalloys industries (K064, K065, K066, K090, and K091) (63 FR 28556, 28579; May 26, 1998). Currently, there are no K waste codes applicable to these four industries.

In general, the K listings target much more specific wastestreams than the F listings. For example, EPA recently added a number of listings to the organic chemicals manufacturing category of the K list. These new listings are for wastes from the production of carbamate chemicals. EPA estimates that only two dozen facilities nationwide produce wastestreams covered by these new K listings. In contrast, F-listed spent solvent wastes are commonly generated in thousands of different plants and facilities. You may also notice that industries that generate K-listed wastes, such as the wood preserving and petroleum refining industries, can also generate F-listed wastes. Typically, K listings describe more specific wastestreams than F listings

applicable to the same industry. For example, K051 and K048 designate as hazardous two very specific types of petroleum refinery wastewater treatment residues: wastewater treatment sludges created in API separators and wastewater treatment float created using dissolved air flotation (DAF) pollution control devices. The F037 and F038 listings complement these two K listings by designating as hazardous all other types of petroleum refinery wastewater treatment sludges and floats. These petroleum refinery listings illustrate that the K listings are typically more specific than the F listings. They also illustrate that the two lists are in many ways very similar.

THE P AND U LISTS: DISCARDED COMMERCIAL CHEMICAL PRODUCTS

The P and U lists designate as hazardous pure or commercial grade formulations of certain unused chemicals. As you will see, the P and U listings are quite different from the F and K listings. For a waste to qualify as P- or U-listed, a waste must meet the following three criteria:

- The waste must contain one of the chemicals listed on the P or U list
- The chemical in the waste must be unused
- The chemical in the waste must be in the form of a "commercial chemical product," as EPA defines that term.

The following paragraphs explore these three criteria in detail and examine EPA's rationale in creating the P and U lists.

You have already learned that hazardous waste listings are narrative descriptions of specific wastestreams and that a waste's actual chemical composition is generally irrelevant to whether a listing applies to it. At first glance, the P and U listings seem inconsistent with these principles. Each P and U listing consists only of the chemical name of a compound known to be toxic or otherwise dangerous; no description is included. EPA adopted this format because the same narrative description applies to all P and U list wastes. Instead of appearing next to each one of the hundreds of P and U list waste codes, this description is found in the regulatory text that introduces the two lists.

The generic P and U list waste description involves two key factors. First, a P or U listing applies only if one of the listed chemicals is discarded unused. In other words, the P and U lists do not apply to manufacturing process wastes, as do the F and K lists. The P and U listings apply to unused chemicals that become wastes. Unused chemicals become wastes for a number of reasons. For example, some unused chemicals are spilled by accident. Others are intentionally discarded because they are off-specification and cannot serve the purpose for which they were originally produced.
The second key factor governing the applicability of the P or U listings is that the listed chemical must be discarded in the form of a "commercial chemical product." EPA uses

the phrase commercial chemical product to describe a chemical that is in pure form, that is in commercial grade form, or that is the sole active ingredient in a chemical formulation. The pure form of a chemical is a formulation consisting of 100 percent of that chemical. The commercial grade form of a chemical is a formulation in which the chemical is almost 100 percent pure, but contains minor impurities. A chemical is the sole active ingredient in a formulation if that chemical is the only ingredient serving the function of the formulation. For instance, a pesticide made for killing insects may contain a poison such as heptachlor as well as various solvent ingredients which act as carriers or lend other desirable properties to the poison. Although all of these chemicals may be capable of killing insects, only the heptachlor serves the primary purpose of the insecticide product. The other chemicals involved are present for other reasons, not because they are poisonous. Therefore, heptachlor is the sole active ingredient in such a formulation even though it may be present in low concentrations.

As you can see, the P and U listings apply only to a very narrow category of wastes. For example, an unused pesticide consisting of pure heptachlor is listed waste P059 when discarded. An unused pesticide consisting of pure toxaphene is listed waste P123 when discarded. An unused pesticide made up of 50 percent heptachlor and 50 percent toxaphene as active ingredients, while being just as deadly as the first two formulations, is not a listed waste when discarded. That is because neither compound is discarded in the form of a commercial chemical product. Why did EPA chose such specific criteria for designating P- or U-listed chemicals as hazardous? When first developing the definition of hazardous waste, EPA was not able to identify with confidence all the different factors that can cause a waste containing a known toxic chemical to be dangerous. It was obvious, however, that wastes consisting of pure, unadulterated forms of certain chemicals were worthy of regulation. EPA used the P and U lists to designate as hazardous wastes consisting of pure or highly concentrated forms of known toxic chemicals. As you will see in the following sections of the module, wastes that remain unregulated by listings may still fall under protective hazardous waste regulation due to the four characteristics of hazardous waste.

2.4 CHARACTERISTIC HAZARDOUS WASTES

A hazardous waste characteristic is a property that indicates that a waste poses a sufficient threat to deserve regulation as hazardous. EPA tried to identify characteristics which, when present in a waste, can cause death or illness in humans or ecological damage. EPA also decided that the presence of any characteristic of hazardous waste should be detectable by using a standardized test method or by applying general knowledge of the waste's properties. EPA believed that unless generators were provided with widely available and uncomplicated test methods for determining whether their wastes exhibited hazardous characteristics, this system of identifying hazardous wastes would be unfair and impractical. Given these criteria, EPA only finalized four hazardous waste

characteristics. These characteristics are a necessary supplement to the hazardous waste listings. They provide a screening mechanism that waste handlers must apply to all wastes from all industries. In this sense, the characteristics provide a more complete and inclusive means of identifying hazardous wastes than do the hazardous waste listings. The four characteristics of hazardous waste are:

- Ignitability
- Corrosivity
- Reactivity
- Toxicity.

The regulations explaining these characteristics and the test methods to be used in detecting their presence are found in Part 261, Subpart C. Note that although waste handlers can use the test methods referenced in Subpart C to determine whether a waste displays characteristics, they are not required to do so. In other words, any handler of industrial waste may **apply knowledge** of the waste's properties to determine if it exhibits a characteristic, instead of sending the waste for expensive laboratory testing. As with listed wastes, characteristic wastes are assigned waste codes. Ignitable, corrosive, and reactive wastes carry the waste codes D001, D002, and D003, respectively. Wastes displaying the characteristic of toxicity can carry any of the waste codes D004 through D043.

IGNITABILITY

Ignitable wastes are wastes that can readily catch fire and sustain combustion. Many paints, cleaners, and other industrial wastes pose such a fire hazard. Most ignitable wastes are liquid in physical form. EPA selected a flash point test as the method for determining whether a liquid waste is combustible enough to deserve regulation as hazardous. The flash point test determines the lowest temperature at which a chemical ignites when exposed to flame. Many wastes in solid or nonliquid physical form (e.g., wood, paper) can also readily catch fire and sustain combustion, but EPA did not intend to regulate most of these nonliquid materials as ignitable wastes. A nonliquid waste is only hazardous due to ignitability if it can spontaneously catch fire under normal handling conditions and can burn so vigorously that it creates a hazard. Certain compressed gases and chemicals called oxidizers can also be ignitable. Ignitable wastes carry the waste code D001 and are among the most common hazardous wastes. The regulations describing the characteristic of ignitability are codified at §261.21.

CORROSIVITY

Corrosive wastes are acidic or alkaline (basic) wastes which can readily corrode or dissolve flesh, metal, or other materials. They are also among the most common hazardous wastestreams. Waste sulfuric acid from automotive batteries is an example of a corrosive waste. EPA uses two criteria to identify corrosive hazardous wastes. The

first is a pH test. Aqueous wastes with a pH greater than or equal to 12.5, or less than or equal to 2 are corrosive under EPA's rules. A waste may also be corrosive if it has the ability to corrode steel in a specific EPA-approved test protocol. Corrosive wastes carry the waste code D002. The regulations describing the corrosivity characteristic are found at §261.22.

REACTIVITY

A reactive waste is one that readily explodes or undergoes violent reactions. Common examples are discarded munitions or explosives. In many cases, there is no reliable test method to evaluate a waste's potential to explode or react violently under common handling conditions. Therefore, EPA uses narrative criteria to define most reactive wastes and allows waste handlers to use their best judgment in determining if a waste is sufficiently reactive to be regulated. This is possible because reactive hazardous wastes are relatively uncommon and the dangers they pose are well known to the few waste handlers who deal with them. A waste is reactive if it meets any of the following criteria:

- It can explode or violently react when exposed to water or under normal handling conditions
- It can create toxic fumes or gases when exposed to water or under common handling conditions
- It meets the criteria for classification as an explosive under Department of Transportation rules.

Wastes exhibiting the characteristic of reactivity are assigned the waste code D003. The reactivity characteristic is described in the regulations at §261.23.

TOXICITY CHARACTERISTIC

The leaching of toxic compounds or elements into groundwater drinking supplies from wastes disposed of in landfills is one of the most common ways the general population can be exposed to the chemicals found in industrial wastes. EPA developed a characteristic designed to identify wastes likely to leach dangerous concentrations of certain known toxic chemicals into groundwater. In order to predict whether any particular waste is likely to leach chemicals into groundwater in the absence of special restrictions on its handling, EPA first designed a lab procedure that replicates the leaching process and other effects that occur when wastes are buried in a typical municipal landfill. This lab procedure is known as the Toxicity Characteristic Leaching Procedure (TCLP). Using the TCLP on a waste sample creates a liquid leachate that is similar to the liquid EPA would expect to find in the ground near a landfill containing the same waste. Once the leachate is created in the lab, a waste handler must determine whether it contains any of 39 different toxic chemicals above

specified regulatory levels. If the leachate sample contains a sufficient concentration of one of the specified chemicals, the waste exhibits the toxicity characteristic (TC). EPA used groundwater modeling studies and toxicity data for a number of common toxic compounds and elements to set these threshold concentration levels. Much of the toxicity data were originally developed under the Safe Drinking Water Act. To recap, determining whether a waste exhibits the toxicity characteristic involves two principal steps: (1) creating a leachate sample using the TCLP; and (2) evaluating the concentration of 39 chemicals in that sample against the regulatory levels listed below in Table 1. If a waste exhibits the TC, it carries the waste code associated with the compound or element that exceeded the regulatory level. The following table presents the toxicity characteristic waste codes, regulated constituents, and regulatory levels. This table and the regulations describing the characteristic of toxicity are codified at §261.24.

Table 1
TOXICITY CHARACTERISTIC CONSTITUENTS AND REGULATORY LEVELS

Waste Code	Contaminants	Concentration
D004	Arsenic	5.0
D005	Barium	100.0
D018	Benzene	0.5
D006	Cadmium	1.0
D019	Carbon tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D007	Chromium	5.0
D023	o-Cresol*	200.0
D024	m-Cresol*	200.0
D025	p-Cresol*	200.0
D026	Total Cresols*	200.0
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor (and its epoxide)	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead	5.0
D013	Lindane	0.4
D009	Mercury	0.2
D014	Methoxychlor	10.0
D035	Methyl ethyl ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium	1.0
D011	Silver	5.0
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D017	2,4,5-TP (Silvex)	1.0
D043	Vinyl chloride	0.2

*If o-, m-, and p-cresols cannot be individually measured, the regulatory level for total cresols is used.

2.5 THE MIXTURE AND DERIVED-FROM RULES

So far, this module has introduced the fundamentals of the hazardous waste identification process and an overview of the hazardous waste listings and characteristics. You should now be able to explain in general terms which solid wastes are hazardous wastes. Now we analyze a new question: "When do these hazardous wastes cease being hazardous wastes?" The regulations governing this issue are commonly known as the mixture and derived-from rules.

BACKGROUND

When EPA first developed the RCRA regulations and the definition of hazardous waste in the late 1970s, the Agency focused on establishing the listings and characteristics, criteria allowing industry to identify which wastes deserved regulation as hazardous wastes. Commenters on EPA's original proposed regulations brought up other key questions about the hazardous waste identification process. For example, these commenters asked, "once a waste is identified as hazardous, what happens if that waste changes in some way? If the hazardous waste is changed, either by mixing it with other wastes or by treating it to modify its chemical composition, should it still be regulated as hazardous?" Faced with a short time frame for answering this difficult question, EPA developed a fairly simple and strict answer and presented it in the mixture and derived-from rules.

LISTED HAZARDOUS WASTES

The mixture and derived-from rules operate differently for listed waste and characteristic wastes. The mixture rule for listed wastes states that a mixture made up of any amount of a nonhazardous solid waste and any amount of a listed hazardous waste is considered a listed hazardous waste. In other words, if a small vial of listed waste is mixed with a large quantity of nonhazardous waste, the resulting mixture bears the same waste code and regulatory status as the original listed component of the mixture. This principle applies regardless of the actual health threat posed by the waste mixture or the mixture's chemical composition.

The derived-from rule governs the regulatory status of materials that are created by treating or changing a hazardous waste in some way. For example, ash created by burning a hazardous waste is considered "derived-from" that hazardous waste. The derived-from rule for listed wastes states that any material derived from a listed hazardous waste is also a listed hazardous waste. Thus, ash produced by burning a listed hazardous waste bears that same waste code and regulatory status as the original listed waste, regardless of the ash's actual properties.

The net effect of the mixture and derived-from rules for listed wastes can be summarized as follows: once a waste matches a listing description, it is forever a listed hazardous waste, regardless of how it is mixed, treated, or otherwise changed.

Furthermore, any material that comes in contact with the listed waste will also be considered listed, regardless of its chemical composition.

Although the regulations do provide a few exceptions to the mixture and derived-from rules, most listed hazardous wastes are subject to the strict principles outlined above. Why did EPA create such a rigid system? To understand the logic behind the mixture and derived-from rules, one must consider the circumstances under which EPA developed them. If EPA relied solely on the narrative listing descriptions to govern when a waste ceased being hazardous, industry might easily circumvent RCRA's protective regulation. For example, a waste handler could simply mix different wastes and claim that they no longer exactly matched the applicable hazardous waste listing descriptions. These wastes would no longer be regulated by RCRA, even though the chemicals they contained would continue to pose the same threats to human health and the environment. EPA was not able to determine what sort of treatment or concentrations of chemical constituents indicated that a waste no longer deserved regulation. EPA therefore adopted the simple, conservative approach of the mixture and derived-from rules, while admitting that these rules might make some waste mixtures and treatment residues subject to unnecessary regulation. Adopting the mixture and derived-from rules also presented certain advantages. For instance, the mixture rule gives waste handlers a clear incentive to keep their listed hazardous wastes segregated from other nonhazardous or less dangerous wastestreams. The greater the volume of hazardous waste, the more expense it is to store, treat and dispose.

CHARACTERISTIC WASTES

As mentioned previously, the mixture and derived-from rules apply differently to listed and characteristic wastes. A mixture involving characteristic wastes is hazardous only if the mixture itself exhibits a characteristic. Similarly, treatment residues and materials derived from characteristic wastes are hazardous only if they themselves exhibit a characteristic. Unlike listed hazardous wastes, characteristic wastes are hazardous because they possess one of four unique and measurable properties. EPA decided that once a characteristic waste no longer exhibits one of these four dangerous properties, it no longer deserves regulation as hazardous. Thus, a characteristic waste can be made nonhazardous by treating it to remove its hazardous property; however, EPA places certain restrictions on the manner in which a waste can be treated. You will learn more about these restrictions in the module entitled Land Disposal Restrictions. Handlers who make characteristic wastes nonhazardous must consider these restrictions when treating wastes to remove their hazardous properties.

There are a few situations in which EPA does not require strict application of the mixture and derived-from rules. EPA determined that certain mixtures involving listed wastes and certain residues from the treatment of listed wastes typically do not pose enough of a health or environmental threat to deserve regulation as listed wastes. The seven principal regulatory exclusions from the mixture and derived-from rules are summarized below.

MIXTURE RULE EXEMPTION

There are three exemptions from the mixture rule. The first exemption from the mixture rule applies to mixtures of solid wastes and wastes listed solely because they exhibit characteristics. As you know, EPA can list a waste as hazardous if that waste typically exhibits one or more of the four hazardous waste characteristics. If a hazardous waste listed only for a characteristic is mixed with a solid waste, the original listing does not carry through to the resulting mixture if that mixture does not exhibit any hazardous waste characteristics. For example, EPA listed the F003 spent solvents as hazardous because these wastes typically display the ignitability characteristic. If F003 waste is treated by mixing it with another waste, and the resulting mixture does not exhibit a characteristic, the F003 listing no longer applies. (Be aware, however, that for the land disposal restrictions, the Agency places certain controls on how hazardous wastes can be treated or mixed with other wastes. Any hazardous waste mixing must be consistent with these rules.)

A second exemption from the mixture rule applies to certain listed hazardous wastes that are discharged to wastewater treatment facilities. This exemption is sometimes referred to as the de minimis wastewater mixture rule. Many industrial facilities produce large quantities of nonhazardous wastewaters as their primary wastestreams. These wastewaters are typically discharged to a water body or local sewer system after being treated to remove pollutants, as required by the Clean Water Act. At many of these large facilities, on-site cleaning, chemical spills, or laboratory operations also create relatively small secondary wastestreams that are hazardous due to listings or characteristics. For example, a textile plant producing large quantities of nonhazardous wastewater can generate a secondary wastestream of listed spent solvents from cleaning equipment. Routing such secondary hazardous wastestreams to the facility's wastewater treatment system is a practical way of treating and getting rid of these wastes. This management option triggers the mixture rule, however, since even a very small amount of a listed wastestream combined with very large volumes of nonhazardous wastewater causes the entire mixture to be listed. EPA provided an exemption from the mixture rule for a number of these situations where relatively small quantities of listed hazardous wastes are routed to large-volume wastewater treatment systems. To qualify for this exemption from the mixture rule, the amount of listed waste introduced into a wastewater treatment system must be very small (or de minimis) relative to the total amount of wastewater treated in the system, and the wastewater system must be regulated under the Clean Water Act.

A third exemption from the mixture rule applies to mixtures involving characteristic wastes and specific mining wastes. This narrow exemption allows certain mixtures to qualify as nonhazardous wastes, even if the mixtures exhibit one or more hazardous waste characteristics. The legality of this exemption has been the subject of litigation between EPA and various interested parties.

DERIVED-FROM RULE EXEMPTION

There are four regulatory exemptions from the derived-from rule. The first of these derived-from rule exemptions applies to materials that are reclaimed from hazardous wastes and used beneficially. Many listed and characteristic hazardous wastes can be recycled to make new products or be processed to recover usable materials with economic value. Such products derived from recycled hazardous wastes are no longer solid wastes. Using the hazardous waste identification process discussed at the beginning of this module, if the materials are not solid wastes, then whether they are derived from listed wastes or whether they exhibit hazardous characteristics is irrelevant. The module entitled Definition of Solid Waste and Hazardous Waste Recycling will explain which residues derived from hazardous wastes actually cease to be wastes and qualify for this exemption.

The other three exemptions from the derived-from rule apply to residues from the treatment of specific wastes using very specific treatment processes. For example, K062 describes spent pickle liquor from the iron and steel industry. Pickle liquor is an acid solution used to finish the surface of steel. When pickle liquor is spent and becomes a waste, it usually contains acids and toxic heavy metals. This waste can be treated by mixing it with lime to form a sludge. This treatment, called stabilization, neutralizes the acids in the pickle liquor and makes the metals less dangerous by chemically binding them within the sludge. EPA studied this process and determined that K062 treated in this manner no longer poses enough of a threat to warrant hazardous waste regulation. Therefore lime-stabilized waste pickle liquor sludge derived from K062 is not a listed hazardous waste. The other exemptions from the derived-from rule for listed wastes are also quite specific.

DELISTING

The RCRA regulations provide another form of relief from the mixture and derived-from rule principles for listed hazardous wastes. Through a site-specific process known as "delisting," a waste handler can submit to EPA a petition demonstrating that while a particular wastestream generated at their facility may meet a hazardous waste listing description, it does not pose sufficient hazard to deserve RCRA regulation. If EPA grants such a petition, the particular wastestream at that facility will not be regulated as a listed hazardous waste. Because the delisting process is difficult, time-consuming, and expensive, it is not considered a readily available exception to the mixture and

derived-from rules. Details on the delisting process are found in the Petitions, Delistings, and Variances module.

The hazardous waste listings, the hazardous waste characteristics, and the mixture and derived-from rules are all essential parts of the definition of hazardous waste, but these key elements are all described in different sections of the RCRA regulations. Only one regulatory section, §261.3, unites all four elements to establish the formal definition of hazardous waste. This section is entitled Definition of Hazardous Waste. Section 261.3 states that all solid wastes exhibiting one of the four hazardous characteristics defined in Part 261, Subpart C, are hazardous wastes. This section also states that all solid wastes listed on one of the four hazardous waste lists in Part 261, Subpart D, are hazardous wastes. Finally, this section explains in detail the mixture and derived-from rules and the seven regulatory exemptions from these rules. Thus, although §261.3 is entitled Definition of Hazardous Waste, it serves primarily as a guide to the mixture and derived-from rules. Substantive rules about the two most crucial elements of the hazardous waste definition, the listings and characteristics, are found elsewhere.

2.6 THE CONTAINED-IN POLICY

The contained-in policy is a special, more flexible version of the mixture and derived-from rules that applies to environmental media and debris contaminated with hazardous waste. Environmental media (singular, "medium") is the term EPA uses to describe soil, sediments, and groundwater. Debris is a term EPA uses to describe a broad category of larger manufactured and naturally occurring objects that are commonly discarded. Examples of debris include:

- Dismantled construction materials such as used bricks, wood beams, and chunks of concrete
- Decommissioned industrial equipment such as pipes, pumps, and dismantled tanks
- Other discarded manufactured objects such as personal protective equipment (gloves, coveralls, eyewear)
- Large, naturally occurring objects such as tree trunks and boulders.

Environmental media and debris are contaminated with hazardous waste in a number of ways. Environmental media are usually contaminated through accidental spills of hazardous waste or spills of product chemicals which, when spilled, become hazardous wastes. Debris can also be contaminated through spills. Most debris in the form of industrial equipment and personal protective gear becomes contaminated with waste or

product chemicals during normal industrial operations. Contaminated media and debris are primary examples of "remediation wastes." In other words, they are not wastestreams created during normal industrial or manufacturing operations. They are typically created during cleanups of contaminated sites and during the decommissioning of factories. Handlers of contaminated media and debris usually cannot control or predict the composition of these materials, which have become contaminated though accidents or past negligence. In contrast, handlers of "as-generated wastes," the term often used to describe chemical wastestreams created during normal industrial or manufacturing operations, can usually predict or control the creation of these wastes through the industrial process. Examples of as-generated wastes include concentrated spent chemicals, industrial wastewaters, and pollution control residues such as sludges.

The hazardous waste identification principles you have learned, including the mixture and derived-from rules, apply to as-generated industrial wastes. EPA decided that a more flexible version of these principles should apply to the primary remediation wastes: environmental media and debris. In particular, EPA determined that strict application of the mixture and derived-from rules was inappropriate for media and debris, especially when listed wastes were involved. Applying the mixture and derived-from rules to media and debris would present certain disadvantages, as the following examples illustrate. First, under the traditional mixture and derived-from rules, environmental media and debris contaminated with any amount of listed hazardous waste would be forever regulated as hazardous. Such a strict regulatory interpretation would require excavated or dismantled materials to be handled as listed hazardous wastes and could discourage environmental cleanup efforts. Second, most spills of chemicals into soil or groundwater produce very large quantities of these media containing relatively low concentrations of chemicals. Strict application of the mixture and derived-from principles to media would therefore cause many tons soil to be regulated as listed hazardous waste despite containing low concentrations of chemicals and posing little actual health threat. Finally, one of the main benefits of the mixture and derived-from rules is not relevant to media and debris. The mixture and derived-from principles encourage handlers of as-generated wastes to keep their listed wastes segregated from other, less hazardous wastestreams to avoid creating more listed wastes. Handlers of contaminated media and debris generally have no control over the process by which these materials come into contact with hazardous waste.

For all of the above reasons, EPA chose to apply a special, more flexible, version of the mixture and derived-from rules to environmental media and debris. Contaminated soil, groundwater, and debris can still present health threats if they are not properly handled and/or disposed. Therefore, EPA requires that any medium and debris contaminated with a listed waste or exhibiting a hazardous characteristic be regulated like any other hazardous waste. Media and debris contaminated with listed hazardous wastes can, however, lose their listed status and become nonhazardous. This occurs

only after a demonstration that the particular medium or debris in question no longer poses a sufficient health threat to deserve RCRA regulation. The requirements for making this demonstration are explained below. Once the demonstration is made, the medium or debris in question is no longer considered to "contain" a listed hazardous waste and is no longer regulated. This concept that media and debris can contain or cease to contain a listed hazardous waste accounts for the name of the policy.

The contained-in policy for environmental media is not actually codified in the RCRA regulations. In legal terms, it is merely a special interpretation of the applicability of the mixture and derived-from rules to soil and groundwater that has been upheld in federal court. These principles for the management of contaminated media are therefore known as a policy instead of a rule. The terms of the contained-in policy are relatively general. In order for environmental medium contaminated with a listed waste to no longer be considered hazardous, the handler of that media must demonstrate to EPA's satisfaction that it no longer poses a sufficient health threat to deserve RCRA regulation. Although handlers of listed media must obtain EPA's concurrence before disposing of such media as nonhazardous, the current contained-in policy provides no guidelines on how this demonstration to EPA should be made. The contained-in policy is a far easier option for eliminating unwarranted hazardous waste regulation for low-risk listed wastes than the process of delisting a hazardous waste mentioned previously. The delisting process demands extensive sampling and analysis, submission of a formal petition, and a complete rulemaking by EPA. A determination that an environmental medium no longer contains a listed hazardous waste can be granted on a site-specific basis by EPA officials without any regulatory procedure.

Debris contaminated with hazardous waste has traditionally been governed by the same nonregulatory contained-in policy explained above. In 1992, EPA codified certain aspects of the contained-in policy for debris in the definition of hazardous waste regulations at §261.3(f). In particular, EPA included a regulatory passage that explains the process by which handlers of debris contaminated with listed hazardous waste can demonstrate that the debris is nonhazardous. This passage also references certain treatment technologies for decontaminating listed debris so that it no longer contains a listed waste. Thus, the term contained-in policy is now something of a misnomer for contaminated debris, since a contained-in rule for debris now exists.

3. REGULATORY DEVELOPMENTS

The hazardous waste identification process is subject to critical review, and adjusted accordingly to reflect technology changes and new information. The hazardous waste listings are particularly dynamic as the Agency conducts further research to incorporate new listings. The following is a brief discussion of several developments to hazardous waste identification.

3.1 THE HAZARDOUS WASTE IDENTIFICATION RULES

EPA proposed to significantly impact the RCRA hazardous waste identification process through a rulemaking effort called the Hazardous Waste Identification Rules (HWIR). One HWIR proposal addressed as-generated waste (HWIR-waste), and the other addressed contaminated media (HWIR-media). EPA has continued to develop the HWIR-waste proposal, but the Agency finalized HWIR-media on November 30, 1998 (63 FR 65874). Both proposals attempted to add flexibility to the hazardous waste identification system by providing a regulatory mechanism for certain hazardous wastes with low concentrations of hazardous constituents to exit the Subtitle C regulated universe.

However, the final HWIR-media rule did not incorporate the provisions that would have removed low risk remediation waste from Subtitle C regulations. EPA determined that the fundamental disagreements between stakeholders prevented the finalization of the entire proposal. Therefore, the final HWIR-media rule addressed four main issues. First, the Agency promulgated a streamlined permitting process for remediation sites that will simplify and expedite the process of obtaining a permit. Second, EPA created a new unit, called a "staging pile," that allows more flexibility when storing remediation wastes during cleanups. Third, the Agency promulgated an exclusion for dredged materials permitted under the Clean Water Act, or the Marine Protection, Research, and Sanctuaries Act. Fourth, the rule finalized provisions that enable states to more easily receive authorization when their RCRA programs are updated in order to incorporate revisions to the federal RCRA regulations.

The HWIR-waste rule, on the other hand, addresses the inflexibility of the hazardous waste listings and the mixture and derived-from rules for as-generated wastes. Remember that currently, with only a few exceptions, a listed waste remains a listed waste, even if it contains very low levels of hazardous constituents, is mixed with large volumes of solid wastes, or is treated to remove hazardous constituents. Such wastes are thus subject to extensive RCRA regulation, even though they may pose very little threat to human health and the environment. HWIR-waste will propose "exit levels" for each of the hazardous constituents in listed wastes. These levels will be generated by

accounting for each constituent's toxicity and ability to migrate in the environment. If the concentrations of hazardous constituents in a waste are below the exit levels, then the waste will no longer carry a listing, and will no longer be hazardous (provided it exhibits no characteristics). This rule would only establish exit levels -- it would not affect how a waste enters the Subtitle C system. In order to enter the system the waste must have been listed or characteristic initially (i.e., merely having constituents above the exit levels will not cause a waste to be a hazardous waste).

To address various concerns, EPA will repropose the HWIR-waste rule by October 31, 1999, and finalize the rule by April 30, 2001.

3.2 HAZARDOUS WASTE LISTING PROPOSALS

EPA first signed a proposed consent decree with the Environmental Defense Fund (EDF) on June 18, 1991, following a suit concerning EPA's obligations to take certain actions pursuant to RCRA. A consent decree is a legally binding agreement, approved by the Court, which details the agreements of the parties in settling a suit. The proposed consent decree, commonly known as the "mega-deadline," settles some of the outstanding issues from the case by creating a schedule for EPA to take action on its RCRA obligations. The consent decree, which has been periodically updated, requires EPA to evaluate specified wastestreams and determine whether or not to add them to the hazardous waste listings.

Pursuant to this consent decree, EPA recently proposed to add two dyes and pigments wastestreams generated by the organic chemicals industry to the K List (64 FR 40192; July 23, 1999). The proposed listings differ from other listed wastes because they are concentration based. The existing listing descriptions allow generators to rely on their knowledge of the waste's origin to determine if the waste is listed. The proposed dyes and pigments wastes listings, however, would require generators to compare the waste constituent levels to specified regulatory levels to determine if the dye and pigment waste codes apply. If the waste constituent levels are below the regulatory levels, generators would need to certify this demonstration to EPA. The Agency expects to finalize this rule by May 2000.

In addition, the Agency recently proposed to list another wastestream specified by the consent decree, chlorinated aliphatic wastes (64 FR 46476; August 25, 1999). EPA proposed to designate three wastes under the chlorinated aliphatic listings. The proposal differs from traditional listings in that the Agency specified a contingent-management listing for one of the three wastes.

3.3 ORGANOBROMINE VACATUR

The United States Court of Appeal for the District of Columbia vacated the ogranobromine listings, K140 and U408, on April 9, 1999. Therefore, the listings are not effective and EPA cannot take any enforcement actions regarding them. EPA intends to issue a notice of the vacatur in the Federal Register in the future.

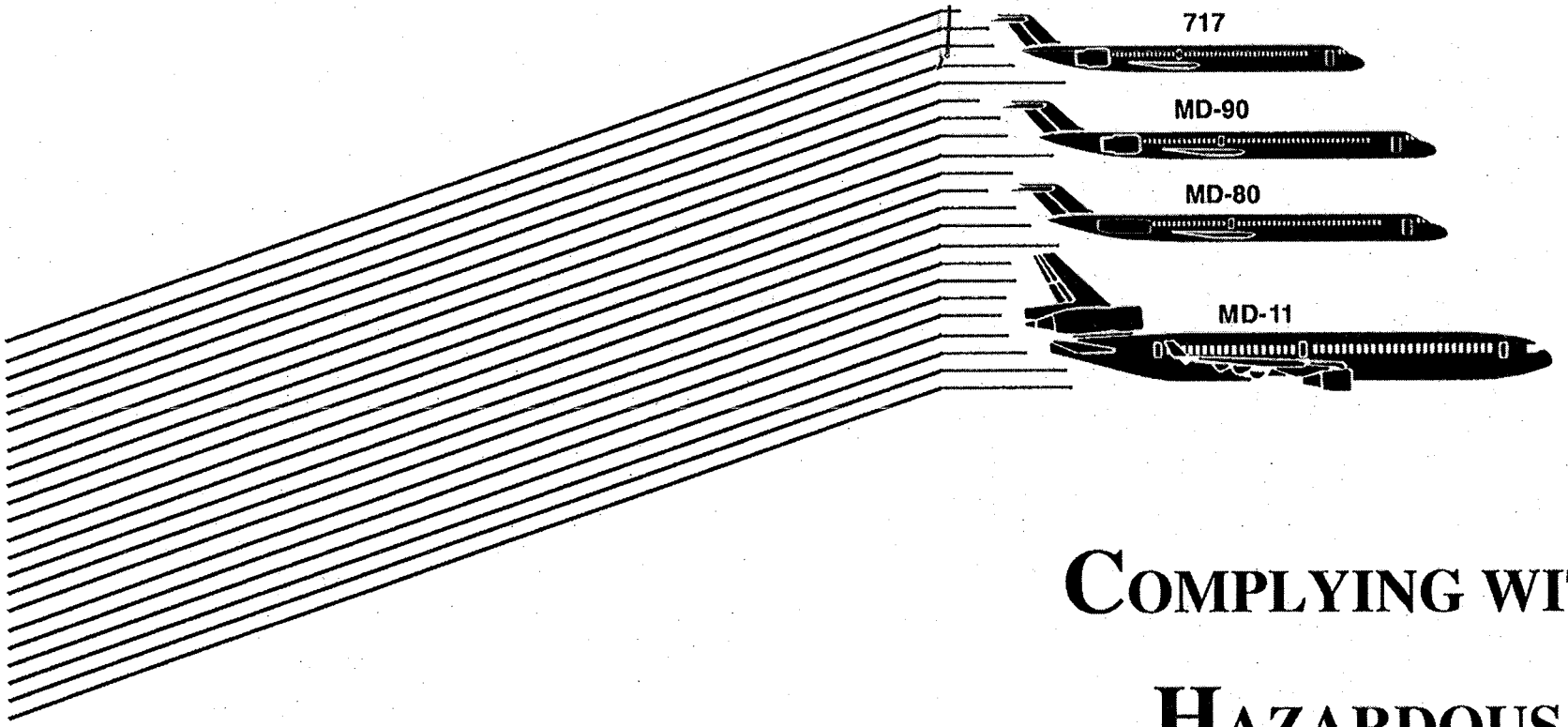
APPENDIX B

APPENDIX B

COMPLYING WITH HAZARDOUS WASTE REGULATIONS ENVIRONMENTAL PROCEDURE: HANDLING OF EXCAVATED SOIL

The Boeing Company

Commercial Technical Development



COMPLYING WITH HAZARDOUS WASTE REGULATIONS

First Edition: July 8, 1999

NOTES

BOEING

Boeing Commercial Airplane Group
Long Beach Division

Complying with Hazardous Waste Regulations

produced by
Environmental Services
and
Commercial Technical Development

Revision:	NEW
Course Code:	56015B
Date:	July 8, 1999

Complying with Hazardous Waste Regulations

Please contact Environmental Services (ES) at 593-4055 if you have any questions regarding the contents of this booklet or other environmental issues.

Introduction

This booklet is intended to provide information regarding the various hazardous waste requirements and regulations that must be met to assure that the operations at Long Beach Division (LBD) are in compliance with all local, state and federal requirements. This booklet will provide a basic summary of the requirements and the reason these requirements must be met. The booklet is not intended to supersede or replace the detailed policies and procedures that are listed on page 9. Employees should refer to the specific policy and/or procedure for a complete list of requirements and actions.

Hazardous waste regulations are intended to protect human health and the environment. Keeping hazardous waste out of our municipal landfills helps us to keep our environment clean. We need to find ways to change the hazardous materials that we use in the production of our aircraft and minimize the amount of materials that we dispose of as waste. If you wish to learn more about the hazardous waste program or other environmental programs at LBD, please visit our web site at:

http://inside.dpd.lgb.cal.boeing.com/env_service

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Types of Hazardous Waste Generated at the Long Beach Division

The Long Beach Division has many different types, of operations that generate hazardous waste(s). These include metal finishing, machining, aircraft assembly, paint and facility maintenance. Waste streams generated from these processes include some of the following; solvents, paints, oils, sealants (sealant tubes), floor dry, acids, caustics, aqueous cleaners and soiled rags.

Hazardous Waste Defined

A hazardous waste is generally any hazardous material for which no use or reuse is intended, which is to be discarded and which is listed or defined as a hazardous waste under applicable environmental statues and/or regulations.

Federal regulations define a hazardous waste as either "characteristic" or as "listed". Characteristic wastes are from non-specific sources and have one or more of the following hazard characteristics; Ignitable, Corrosive, Reactive or Toxic. Listed waste are from specific sources such as wastewater treatment sludges from electroplating operations.

The State of California regulations pertaining to the classification and management of hazardous waste are more stringent than the federal regulations. Consequently, several manufacturing waste streams which are unregulated at the federal level are managed as hazardous wastes in California, (e.g. waste oil). It is the responsibility of the Environmental Services department to classify the waste stream per the federal and state regulations. Classification is based upon generator knowledge or testing of the waste stream in accordance with LBD's Waste Analysis Plan.

Hazardous waste management requirements at LBD are specified in SPS 105. In addition, the Environmental Services web site on the Boeing intranet provides information on hazardous waste and other environmental programs:

http://inside.dpd.lgb.cal.boeing.com/env_service

Types of Hazardous Waste Containers

Here at LBD we utilize different types of containers to hold hazardous waste. Environmental Services has color coded drums /bins to handle our most common waste streams for ease of identification as outlined in the table below.

Metal Drums Blue	**Waste Streams** Resins / Adhesives, Mixing Cups and Empty Containers
Yellow	Aerosols
Green	Sealant Tubes/FR Primer
Red	Soiled Rags / Shop Towels

Metal Bins Yellow with red stripe	**Waste Streams** Empty Containers, Other Hazardous Solids
Red	Soiled Rags / Shop Towels

There are also other containers, black metal or blue plastic 30 or 55 gallon drums that are utilized for a variety of waste streams. Prior to placing waste into any hazardous waste container, verify that the waste description on the label matches the waste you are intending to discard.

All containers of hazardous waste will have labels (Form DAC 22-209) which identify the contents, physical state and hazard associated with the waste (see Figure 1). The container will also have a unique serialized identification number issued by Environmental Services for tracking purposes. The labels and serialized number will already be on the container when you the generator receive the container (see Figure 2). If you have a container without either one of these then you are not utilizing an authorized hazardous waste container.

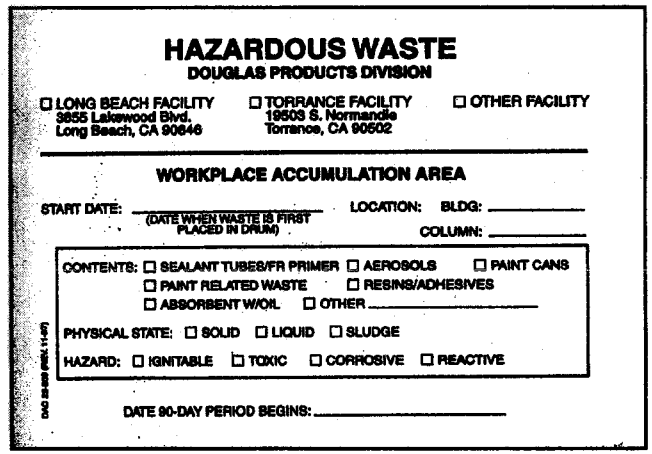
HAZARDOUS WASTE
DOUGLAS PRODUCTS DIVISION
☐ LONG BEACH FACILITY 3855 Lakewood Blvd. Long Beach, CA 90846
☐ TORRANCE FACILITY 19503 S. Normandie Torrance, CA 90502
☐ OTHER FACILITY
WORKPLACE ACCUMULATION AREA
START DATE: _____ (DATE WHEN WASTE IS FIRST PLACED IN DRUM)
LOCATION: BLDG: _____
COLUMN: _____
CONTENTS: ☐ SEALANT TUBES/FR PRIMER ☐ AEROSOLS ☐ PAINT CANS ☐ PAINT RELATED WASTE ☐ RESINS/ADHESIVES ☐ ABSORBENT W/OIL ☐ OTHER _____
PHYSICAL STATE: ☐ SOLID ☐ LIQUID ☐ SLUDGE
HAZARD: ☐ IGNITABLE ☐ TOXIC ☐ CORROSIVE ☐ REACTIVE
DATE 90-DAY PERIOD BEGINS: _____

Figure 1

Hazardous waste containers are only provided by Environmental Services. If your area does not have an appropriate container then you can contact the Facilities Maintenance Trouble Call Board at x33101 and place a work order. An Environmental Services employee will then contact you to determine the appropriate container.

If a generating department wishes to utilize containers other then those offered by Environmental Services for hazardous waste then Environmental Services department must be contacted.

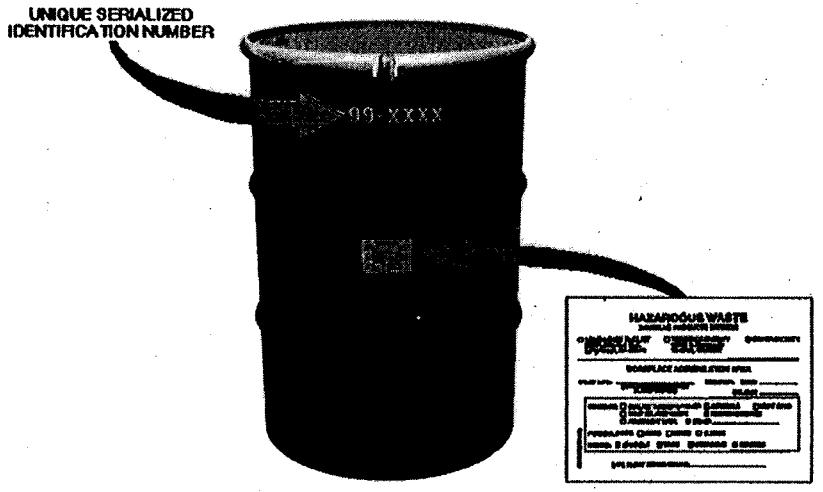

Figure 2

Generating Department Requirements

The primary responsibilities of each employee who generates hazardous waste in his or her work operations are:

(1) to discard hazardous waste generated into appropriate containers, as described in the preceding section.

(2) keep all hazardous waste containers closed except when it is necessary to add waste.

(3) report all spills of hazardous materials and/or waste immediately to LBD's emergency number, x32111.

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Hazardous Waste Satellite Accumulation Areas

Hazardous waste satellite accumulation areas are designated areas throughout the shop floor where hazardous waste containers are collocated. These areas are intended for use by a single waste generating department and/or operation and may be comprised of several different types of hazardous waste drums/bins (see preceding section) which are specific to that area/operation. The waste(s) in these designated satellite accumulation areas are removed on a routine basis by Environmental Services.

In addition, work orders may be placed through the Facilities Maintenance Trouble Call Board (x33101) to arrange for the following:

(1) Non-routine pickup of wastes in designated satellite accumulation areas.

(2) Establishing a new hazardous waste satellite accumulation area.

(3) Requesting additional and/or different types of hazardous waste containers.

Hazardous Waste Yard

Hazardous waste(s) that are removed from satellite accumulation areas are transferred by Environmental Services to the Building 47 Hazardous Waste Yard. It is here that the waste(s) are readied for shipment to an off-site facility designated for the recycling, treatment or disposal of the specified waste stream(s). Activities, which occur in the Hazardous Waste Yard, include waste identification, segregation, consolidation and packaging, marking and labeling. As a hazardous waste generator, LBD may accumulate hazardous waste on-site for a period of not more than 90 days.

Hazardous Waste Disposition

The State of California has established the following hierarchy for the management of hazardous wastes:

Recycling (on site and off site)

Treatment (on site and off site)
- Incineration
- Chemical Treatment

Land Disposal
- Treatment
- Direct Landfill

This hierarchy is recommended in order to reduce the amount of waste going to landfills and thereby minimize the threat to the environment. Whenever possible, LBD utilizes this hierarchy to manage its waste streams.

LBD sends some of its waste streams off site for what is known as "fuels blending". This is actually using the waste as an alternative fuel for the cement industry. The cement kiln utilizes our waste as fuel instead of solely relying on natural resources, such as natural gas or coal. This process fits into the State of California's definition of recycling.

Some waste streams that can not be "fuel blended" are sent off site for high temperature thermal incineration.

Liquid chemicals that have either acidic or basic chemical properties are also sent offsite for recycling and/or treatment. These waste streams are either recycled for their metal content or are utilized as a chemical in the treatment process, thus the waste stream is recycled.

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If none of the above options is available for the waste stream then it is sent for offsite land disposal. Waste streams that are sent to landfills are "treated" before landfilling. This can either be done by what is called chemical fixation or chemical binding of the material. The waste stream can also be macro encapsulated, that is placing the waste into sealed plastic vaults. If the waste stream requires no treatment it can be directly landfilled.

Regardless of which option is used, LBD is utilizing the best available environmental technology while still being cost efficient.

Hazardous Waste Minimization

It is important that employees take measures to reduce the amounts of hazardous waste(s) generated in their work operations. The simplest of these techniques is to take only what is needed to complete the job and, to the extent possible utilize all of the material in a container prior to discarding it. Several of LBD's major waste streams (e.g. Paint Related Waste, Sealant Tubes) are composed of a large percentage of partially full to full containers and expired shelf life materials. Effective hazardous materials management in your daily work activity will not only reduce the costs associated with the disposal of these unused materials but also will reduce the cost of purchasing replacement materials.

Pertinent Procedures

DAC-105 Hazardous Waste Management

Additional Environmental Procedures

DAC-006 Safety, Health and Environmental Program
DAC-085 Control/Use of Process/Thermal Equipment
DAC-062-042 Environmental Self-Inspections
DAC-175 Hazardous Materials Management

COURSE QUIZ

COURSE CODE: 56015B Rev: New

To receive one hour of training credit for reading this booklet:

a. Fill out the personal data section of the Scantron form provided in the back of this booklet.
PHOTOCOPIES ARE NOT ACCEPTABLE.

b. Mark the answers for questions 1-10 below on the Scantron form with a No.2 or equivalent pencil.

c. Detach the Scantron form from the booklet and mail to:
Technical Development, C1, Dept. Q5C, M/C: D098-0098.

Complying with Hazardous Waste Regulations

1. The Long Beach Division generates only metal finishing hazardous waste.
   A. True
   B. False

2. A characteristic hazardous waste may have which of the following characteristics:
   A. Ignitable
   B. Corrosive
   C. Reactive
   D. All of the above

3. Listed hazardous wastes are from specific sources, such as waste water treatment sludges from electroplating operations.
   A. True
   B. False

4. California hazardous waste regulations are less stringent than federal regulations.
   A. True
   B. False

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COURSE QUIZ CONTINUED

5. Classification of hazardous waste is the responsibility of the Environmental Services Department.
   A. True
   B. False

6. Yellow hazardous waste drums are intended for the accumulation of:
   A. Rags / Shop Towels
   B. Aerosols
   C. Sealant Tubes
   D. None of the above

7. All containers of hazardous waste will have labels and a serialized number issued by Environmental Services.
   A. True
   B. False

8. It is OK to leave a hazardous waste container open during your shift, as long as you close it before you leave for the day.
   A. True
   B. False

9. If there is a spill of hazardous materials and/or waste, employees are to call 911.
   A. True
   B. False

10. If you need a new hazardous waste satellite area or container employees are to call:
   A Fire dispatch
   B. Facilities Maintenance Trouble Call Board.
   C. Environmental Services Hotline
   D. None of the above

END OF QUIZ

NOTES

Long Beach Division
BOOKLET ANSWER SHEET

Book Title:_____

Fold then tear along perforation

IMPORTANT
* Use No. 2 pencil only.
* Example: ● Ⓑ Ⓒ Ⓓ
* Erase completely to change

COURSE CODE

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1	1	1	1	1	B
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3	3	3	3	3	
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8	8	8	8	8	
9	9	9	9	9	

EMPLOYEE NO.

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1	1	1	1	1	1
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DATE

Month	Day	Year
JAN ○	0 0	0 0 0 0
FEB ○	1 1	1 1 1 1
MAR ○	2 2	2 2 2 2
APR ○	3 3	3 3 3 3
MAY ○	4 4	4 4 4 4
JUN ○	5 5	5 5 5 5
JUL ○	6 6	6 6 6 6
AUG ○	7 7	7 7 7 7
SEP ○	8 8	8 8 8 8
OCT ○	9 9	9 9 9 9
NOV ○		
DEC ○		

REVIEW

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2	Ⓐ Ⓑ Ⓒ Ⓓ	12	Ⓐ Ⓑ Ⓒ Ⓓ
3	Ⓐ Ⓑ Ⓒ Ⓓ	13	Ⓐ Ⓑ Ⓒ Ⓓ
4	Ⓐ Ⓑ Ⓒ Ⓓ	14	Ⓐ Ⓑ Ⓒ Ⓓ
5	Ⓐ Ⓑ Ⓒ Ⓓ	15	Ⓐ Ⓑ Ⓒ Ⓓ
6	Ⓐ Ⓑ Ⓒ Ⓓ	16	Ⓐ Ⓑ Ⓒ Ⓓ
7	Ⓐ Ⓑ Ⓒ Ⓓ	17	Ⓐ Ⓑ Ⓒ Ⓓ
8	Ⓐ Ⓑ Ⓒ Ⓓ	18	Ⓐ Ⓑ Ⓒ Ⓓ
9	Ⓐ Ⓑ Ⓒ Ⓓ	19	Ⓐ Ⓑ Ⓒ Ⓓ
10	Ⓐ Ⓑ Ⓒ Ⓓ	20	Ⓐ Ⓑ Ⓒ Ⓓ

OFFICE USE ONLY

0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

-DA

Name:_____

Loc:_____ Dept. #:_____ Shift: _____

Supervisor's Name:_____

Supervisor's Ext:_____

DAC 35-924 (Rev. 24 FEB 1999)

COMMERCIAL SEGMENT

LBD SAFETY/ ENVIRONMENTAL MANUAL

ENVIRONMENTAL PROCEDURE

DAC-062-043
30 April 1999

HANDLING OF EXCAVATED SOIL

SUPERSEDES:
New

A. *APPLIES TO:*

Facilities Services; Safety, Health & Environmental Affairs (SH&EA)

B. *PURPOSE:*

This procedure provides guidelines for handling excavated soil generated during construction projects.

C. *DEFINITIONS:*

Hazardous Waste Rolloff Bin: A portable steel container which is used to temporarily store and transport hazardous waste. Typical bin sizes used at the Long Beach Division (LBD) are eight (8) cubic yard and twenty (20) cubic yard capacity.

Total Petroleum Hydrocarbons (TPH): Organic compounds derived from crude oil which are potential soil contaminants at commercial and industrial facilities utilizing petroleum–based fuels and lubricants.

Volatile Organic Compounds (VOC): Any volatile compound containing carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, ammonium carbonate, and exempt compounds. The definition of "exempt compound" can be found in Rule 102 of the South Coast Air Quality Management District.

D. *REQUIREMENTS:*

General:

1. Whenever excavated soil is to be removed from LBD property for ultimate offsite disposal or offsite reuse, soil sampling and appropriate laboratory analysis will be required.
2. All sampling and analysis shall be conducted and analytical results received and reviewed by LBD Environmental Services prior to offsite disposition of the soil.

Handling of Impacted Soil:

3. In the event that impacted soil (odor and/or discoloration) is encountered during excavation, the soil shall be placed into hazardous waste containers which will be provided by LBD. LBD Environmental Services personnel and their contractors will be responsible for the sampling of the container contents and the manifesting and ultimate disposal of the soil.
4. If impacted soil is suspected to be encountered prior to excavation, arrangements should be made at least 24 hours in advance of excavation with LBD Environmental Services so that hazardous waste containers can be provided onsite at the start of excavation. Arrangements should be made as necessary throughout the duration of excavation to ensure that containers are available at the start of each day.

5. If using hazardous waste rolloff bins, no more than eight (8) to ten (10) cubic yards of soil should be placed into any one bin, to allow the bin transporter to lift the bin onto itself. Overloaded bins will have to be lightened by the excavation contractor prior to offsite transport of the bins.
6. Excavation of any VOC–contaminated soil shall be performed only by a contractor who possesses a valid South Coast Air Quality Management District (SCAQMD) Rule 1166 Contaminated Soil Mitigation Plan. A copy of this plan shall be provided to LBD Environmental Services prior to excavation of any VOC–contaminated soil from LBD property. Additional soil handling requirements outlined in the Mitigation Plan will be required if VOC–contaminated soil is encountered.

E. ACTIONS:

Environmental Services:

1. Consult with LBD project manager prior to start of project to develop soil sampling and analysis strategy.
2. Contract with environmental sampling contractor and analytic laboratory to perform sampling and analysis as required.
3. Specify locations for sampling and analysis to be performed on samples.
4. Review laboratory results and report results and any necessary further action to LBD project manager.
5. If VOC–contaminated soil is encountered, obtain and review excavation contractor's SCAQMD Rule 1166 Contaminated Soil Mitigation Plan prior to excavation of VOC–contaminated soil and ensure that contractor complies with its requirements before, during, and after excavation. Obtain copies of all Rule 1166 monitoring records as required.
6. Contract with hazardous waste services provider to supply and transport hazardous waste rolloff bins as necessary.
7. Arrange for the offsite disposal of impacted soil as necessary.

Facilities Services:

8. Notify Environmental Services prior to start of any projects requiring excavation and offsite disposal of soil. Consult with Environmental Services to develop sampling and analysis strategy. Allow for sampling and analysis costs in project budget.
9. Notify Environmental Services immediately if odor or discoloration is detected in the soil.
10. Notify Environmental Services at least 24 hours in advance if hazardous waste rolloff bins are required.
11. Ensure that contractor performing excavation work has valid SCAQMD Rule 1166 Contaminated Soil Mitigation Plan before beginning excavation of any VOC–contaminated soil.

F. TRAINING REQUIREMENTS:

All Facilities Services and SH&EA personnel who manage outside contractors who perform soil excavation shall be trained on the content of this procedure by reading the procedure and completing the corresponding booklet quiz.

G. ATTACHMENTS:

None

H. REFERENCES:

General

South Coast Air Quality Management District (SCAQMD) Rule 1166

Revision Notes:

New Procedure.

Prepared By:

Facilities Change Board
Environmental Services 593-4055

APPENDIX C

APPENDIX C

FORMS AND LABELS

WASTE CONTAINER REQUEST

FORMER C-6 FACILITY
TORRANCE, CALIFORNIA

CONTAINER TYPE	QUANTITY
☐ 55-gallon drums	_____
☐ 8 yd^3 roll-off bin	_____
☐ 20 yd^3 roll-off bin	_____

☐ Hold for pickup

☐ Deliver to:

EIA No. _____
Bldg No. _____
Column No. _____
Other _____
_____
_____
_____

REQUESTED BY:

Name _____
Title _____
Affiliation _____
Date _____

Signature _____

Fax or hand-deliver this request to:

_____
_____
_____
Tel _____
Fax _____

WASTE CONTAINER CONTENTS LOG

FORMER C-6 FACILITY
TORRANCE, CALIFORNIA

CONTAINER NUMBER (S):

CONTAINER TYPE 55-gallon drums ☐ 8yd^3 roll-off bin ☐ 20 yd^3 roll-off bin ☐

GENERAL DESCRIPTION OF GENERATING PROCESS _____

SPECIFIC SOURCES CONTRIBUTING WASTE TO THIS CONTAINER OR GROUP OF CONTAINERS

EIA No.	BLDG No.	ET No.	BORING/WELL Nos	DATE ADDED

This log maintained by _____ (name) _____ (title)

_____ (affiliation). Waste conatiners sealed on _____ (date)

Signature _____ Date _____

BOE-C6-0140482

APPENDIX D

APPENDIX D

POSTDEMOLITION SOIL MONITORING PROTOCOL

APPENDIX D
POSTDEMOLITION SOIL MONITORING PROTOCOL

During site demolition activities, field crews will provide soil quality monitoring during building slab removal and/or other construction activities that expose soil, such as subsurface utility removal. The purpose of this phase of soil monitoring is two fold:

1. Confirm the previous delineation of areas of concern (AOCs) with visual observations, and

2. Identify previous unknown AOCs that may be beneath structures or within utility corridors.

D.1 FIELD INVESTIGATION

Protocol for postdemolition soil monitoring is based on visual observation of evidence of soil impacts as well as field monitoring of surface soil. Figure D-1 presents a flowchart for the postdemolition soil monitoring process. This protocol assumes that the areas under investigation are clean, but the sampling is conducted in a somewhat untargeted, and random way in order to provide evidence to confirm or refute this hypothesis. This is an example of Boeing Realty Company's (BRC's) efforts to address soil impacts at the facility in a comprehensive manner. Field crews will conduct walking transects and make visual observations as buildings, foundations, utilities, and other structures are removed and the underlying soil is exposed. Photoionization detector (PID) headspace vapor monitoring will also be conducted on an approximate 50-foot grid across the newly exposed portions of the site.

If previously unknown soil impacts are observed and have the potential of exceeding the Field Action Levels (FALs) or require removal, the impacted area will be exposed with a backhoe to approximately 5 feet below ground surface (bgs). If visual impacts extend below 5 feet, the area will be classified as an AOC and a more comprehensive investigation will be scheduled. The investigation will include advancing a soil boring to estimate the depth of impact. If visual impacts extend less than 5 feet bgs and the soil can be immediately removed, the soils will be excavated and segregated in accordance with the Solid Waste Management Plan (SWMP). If the soil cannot be immediately removed, the location will be marked and will be subsequently addressed in accordance

with the SWMP. Confirmation soil samples will be collected from the base and sidewalls of the excavation. If the confirmation soil samples are below FALs or meet the requirements of the risk assessment, the data will be filed with the Project Data Manager and the case will be considered closed.

The collective professional judgment of the Field Team, Program Leaders, and BRC representatives will be used to evaluate each postdemolition soil impact area found. Each impact area found, however, will be marked and observations will be recorded for inclusion in the report.

For areas with no visual impact but elevated PID readings, the head-space grid size around the impacted area will be reduced and resampled to better define the lateral limits of the soil impact. If the impacted area (as measured by headspace PID readings) has the potential of exceeding FALs or requiring removal, the location will be exposed with a backhoe (as above) to approximately 5 feet bgs. If significant PID impacts extend below 5 feet, then the location will be classified as a new AOC and scheduled for a more comprehensive investigation using a soil boring to characterize the depth of impact. Soil samples will be collected as needed to define the vertical limits of soil impact.

Alternatively, if PID-measured impacts extend less than 3 feet bgs, soils will simply be excavated and segregated in accordance with the SWMP as discussed above. Excavation confirmation soil samples will be analyzed for constituents historically used in the area. If historical chemical use is unknown, soil samples will be analyzed for VOCs and petroleum hydrocarbons.

If impacts are found and are not covered by the criteria presented above, BRC and the Los Angeles Regional Water Quality Control Board (LARWQCB) will be notified and a customized response will be prepared so that a field sampling strategy can be quickly developed and implemented.

When all data from the postdemolition monitoring effort are available from the laboratory, it will be confirmed that the Project Data Manager has also received the data. If any new AOCs have been defined during slab-removal soil monitoring, the data will be evaluated to assess whether soil impacts at the new AOCs exceed the FALs or requirements of the risk assessment. If no constituents are found to be above their respective FALs, then the field investigation for the new AOC will be complete.

However, if FALs or risk assessment criteria are exceeded, the available data will be interpreted to evaluate if the zone of soil impact that exceeds FALs or risk assessment criteria at the new AOC has been delineated. If the zone of soil impact has been adequately delineated, the field investigation for the new AOC will be complete.

If the impacted area has not been adequately delineated, then a supplemental soil investigation for the new AOC in accordance with the procedure discussed above for AOC revisits will be scheduled.

D.2 Postdemolition Soil Investigation Report

As demolition and slab removal progresses across the site, a Postdemolition Soil Inspection and Investigation Report will be prepared to document observations and findings from soil investigations conducted during and after slab removal.

The postdemolition reports will include tables summarizing the results and will include citations to the Project Environmental Data Management System (EDMS) to direct the reader to electronic versions of the complete set of analytical results. The report will also include maps showing locations of samples and interpretation of the extent of contamination discovered during demolition and slab removal soil monitoring. The report will also present the data and results of any soil excavated during the postdemolition soil monitoring effort.

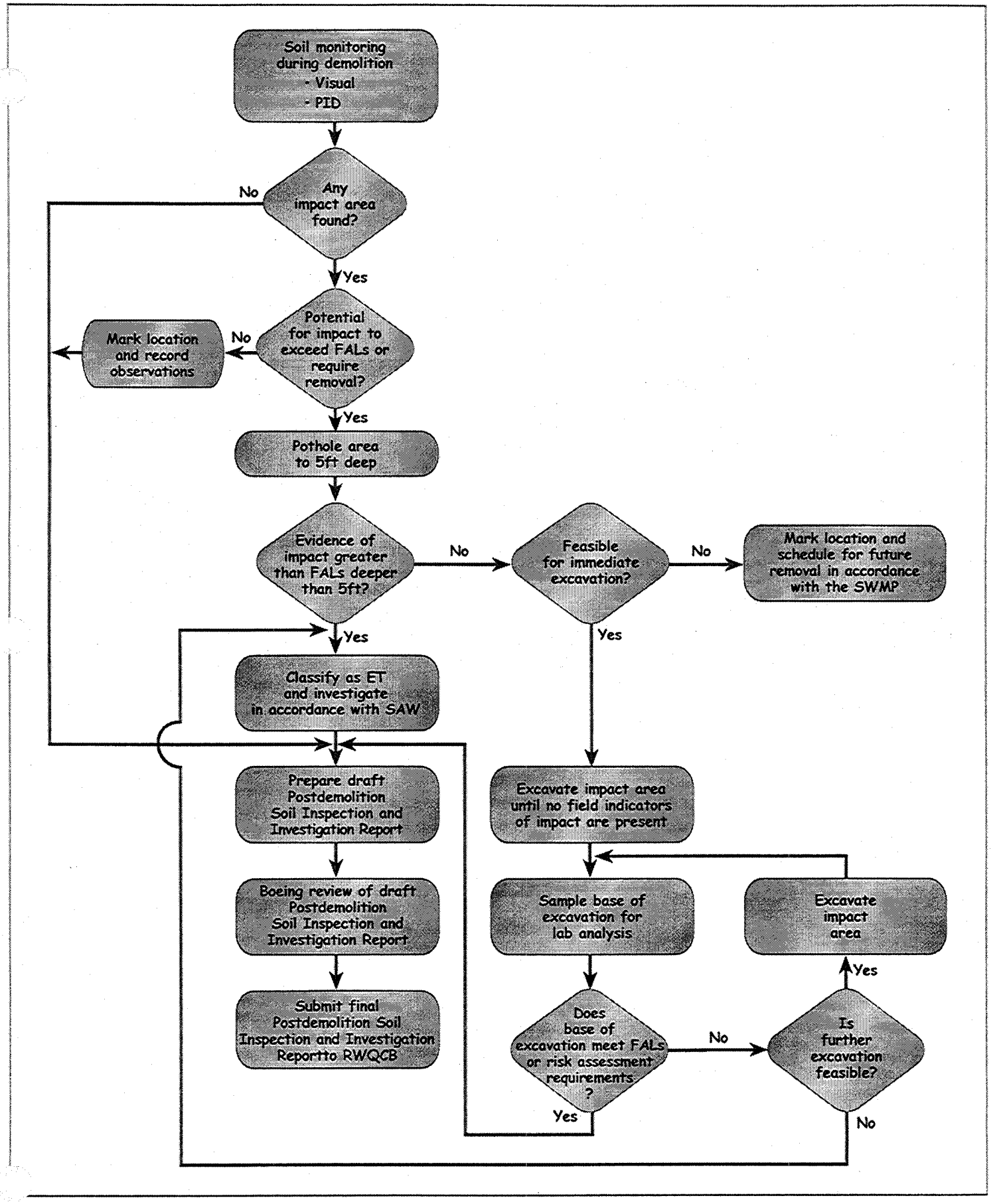

Figure D-1. Flowchart
Postdemolition Soil Monitoring